"The Government Can't Do It Alone"

THIS is neither the time nor the place to say "We told you so"—neither should there be any disposition by citizens, business men nor politicians of any party, of any school of thought, or previous condition of socialized conviction, to indulge in any "I was smarter than thou" attitude. But, it is the time for congratulations. The time to foregather and get together. The time to extend hand grips to each other in the greatest determined joint effort to clinch the manifest definite turn to the right, as was announced by Donald Richberg, in his recent speech, when he plead with industry and business to join with the administration in hastening the business recovery.

He it was, the President's closest and most trusted advisor, who uttered this most significant sentence in his peroration, "The Government can't do it alone." No! The Government can't, but the Govment and the business men and industrialists joining together, in an immense forward *putsch* at this time, can.

This announcement by Mr. Richberg—these six words flashed over this country, to its remotest hamlets,—was like an electric switch turning on myriads of lights in vast darkened wastes. The response from the country has been instantaneous and altogether gratifying. The stock markets immediately advanced. The commodity markets turned upward and expanded. The mills have begun to take on more men. More factories are humming with increased activities due to the receipt of more orders. Confidence is returning rapidly. We believe this electric sentence was spoken at the exact epochal moment.

For the ground work for a return trip to prosperity has been long in the making and has been thoroughly prepared.

The turning point for industry and for newer, better, bigger business has surely arrived.

Lift up your eyes! Perceive the indubitable evidences of the pent-up, potential needs that are pressing for fulfillment. Never before has any nation under the canopy of heaven at any time, ever faced such a huge volume of held back orders crying in trumpet tones to be released.

Pent-up demands for the past five years, suppressed and repressed, are now to be repressed no longer. Like a huge log jam of vast extent and unmeasurable depth, artificially held back, has piled up volume upon volume until the whole incredible accumulation is about to burst forth, perforce the sheer weight of its backed-up power.

For five long years, the unsatisfied desires of the nation's homes, highways, farms, factories, industries, railroads and municipalities have waited impatiently for this zero hour of fulfillment.

The specifications are already blueprinted calling for more than forty billions of durable and capital goods, needing immediate production. The execution of this necessitous industrial program will set every idle man and every idle dollar at strenuous work for years to come and before we can finish it, we shall not have caught up with the last ten years of obsolescence. Progress no longer will be blocked. These huge potential possibilities for prosperity demand action.

The Government sees the light.

Business men recognize the opportunity.

We have gotten together again. We are all going to work together.

"*The Government can't do it alone.*"

+ EDITORIAL +

Achievement Records

THE average business organization is proud of its accomplishments. If any of its leaders have the facts, they like to boast that their company has done business on the same site for five, ten, twenty-five, fifty or more years; that they have grown from a very small organization to one of the outstanding leaders in their field; that they have made a contribution to business and to civilization that goes deeper and farther than simply dollars and cents.

There are many pulp and paper mill organizations with a most interesting past, an active present, and a future that is ever unfolding. Perhaps your organization might be counted among them.

If so, how are your records? Can you actually prove your right to this inheritance or is the information concerning past activities of your company largely of legendary character? Whatever the case, might it be suggested that achievements of today are but stepping stones for achievements of tomorrow? Record them. They will be helpful to your organization in the future and perhaps to the entire industry of which your company is a part.

What Was Your Answer?

SOME mill officials who control expenditures believe that more tonnage is the one way to more profits. To be sure more business would permit many mills to increase dividends, but it certainly is not the only way that is open for doing it.

Profits, for example, can come from a decrease in production costs as well as from an increase in sales volume; and such profits might be much more easily realized.

Maybe there is need for replacing a machine that is worn out, or making some equipment installation that is entirely new to the plant. Maybe some rearrangement of equipment seems desirable; or that power and maintenance costs can be reduced appreciably by eliminating obsolete equipment.

Perhaps, your mill superintendent, plant engineer, or some other production executive has pointed out possibilities in this direction to you.

If the plan suggested was unsound, did you point out the weakness and encourage the one who suggested it to try again, or did you simply state that the plan did not interest you—that you could not spend the money?

Whatever answer was given might determine whether the desired profits have been forthcoming, or if they will be in the future.

Why Do We Keep Christmas?

THE holiday season arouses something that is more deeply rooted in the hearts of men than hate, pride or self satisfaction; something that is greater than power; something that is far richer than wealth. The momentous problems of a nation are overshadowed by the spirit of peace and good will—the same spirit that has endured more than nineteen centuries of chaos in a turbulent world. The rays of hope that shone from the star of Bethlehem in old Judea by which the wise men were led to the manger where they found the Christ Child have never grown dim, but their effulgence still guides the people of the earth through the vicissitudes of human experiences.

In the Christmas number of a well-known home magazine, an editorial written as an allegory, tells the story of a nation that being confronted with great economic and financial problems sent out an edict that no one should keep Christmas; there was to be extreme conservatism with none of the festivities that had marked the holiday season throughout the country's history. The loyal citizens tried to keep the letter of the law, but there was Christmas in their hearts, and as the day of days drew near they were overcome with a great longing that was stronger than their desire to obey the ruling of the country's mandates. Citizens were apprehended bringing home evergreen trees; housewives covertly prepared foods to grace the season and smuggled home gifts for the children. By the time the day really arrived, the entire country had overthrown the edict of conservatism and had launched upon a celebration of Christmas such as it had never known before.

The greatest wealth and the strongest fortification of any nation is the spirit of the Christ which lives in the hearts of its people. The universal exchanging of gifts and greetings at Christmas time is not just a seasonal expression—it is the never failing sign of the peace and good will that is a part of the everyday lives of humanity. It is the same spirit that lends a helping hand to the needy, that forgives a wrong—it is the very essence of the brotherhood of man.

No one can afford not to keep Christmas, for to keep it truly, one must give, and by giving, life is enriched and made more abundant in blessings.

With the real spirit of Christmas that is even now being felt all over the land, the publisher and staff of The Paper Industry extend to the readers of this magazine the Greetings of the Season, with the hope that the New Year will bring a realization of greater happiness and prosperity.

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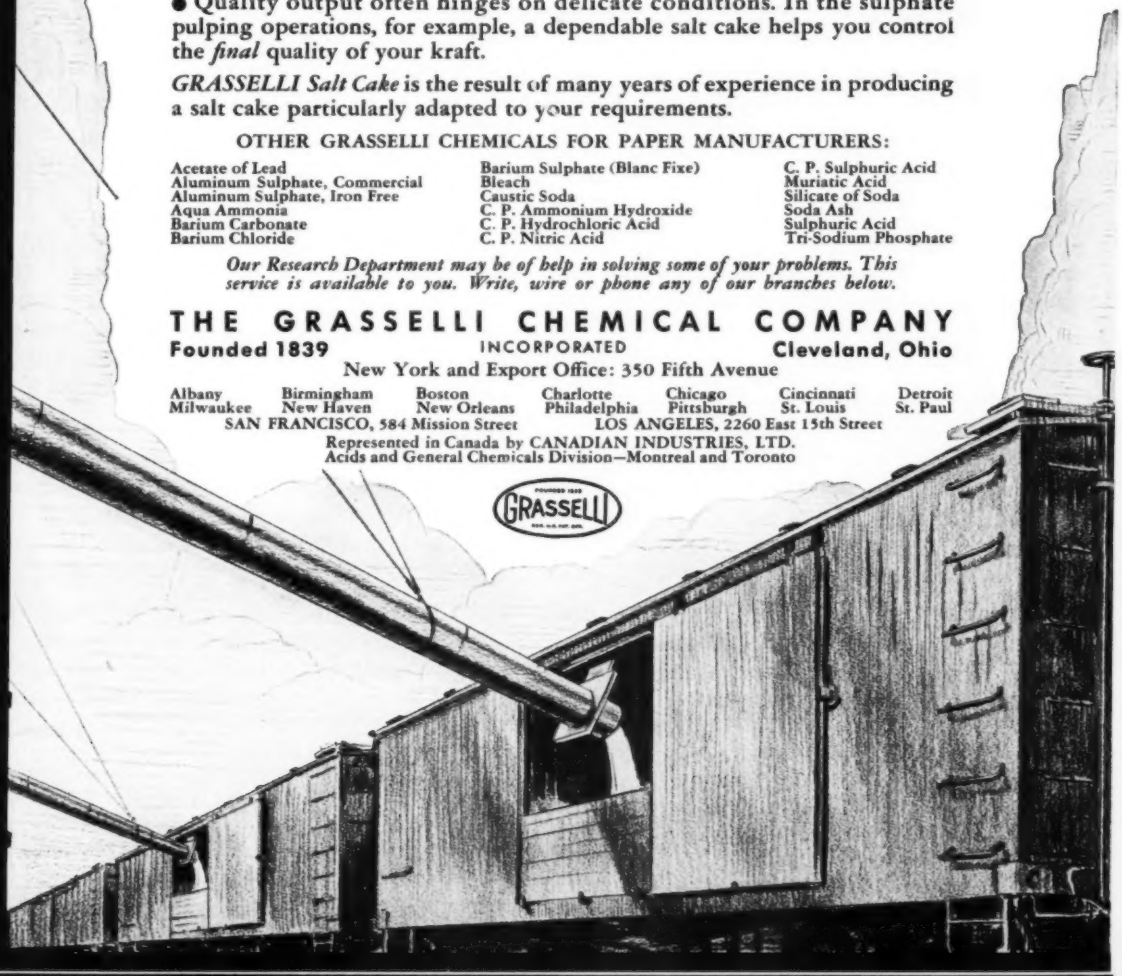

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Thirty Hours a Week . . . ?

By WILLIAM SIBLEY

ONE of the bills destined to play a prominent part in the deliberations of the coming Congress is the Black-Connery bill denying interstate commerce to industries employing persons for more than six hours a day or five days a week; permitting no reduction in the weekly wage by reason of shortening of work hours; and setting up the machinery for enforcement.

The passage of this bill would mean an immediate increase of about twenty-five per cent in the cost of producing goods. This would bring about an immediate decrease in production, as shown by our recent experience in several arbitrarily codified industries.

Basically the idea of the thirty-hour week is founded on the strange theory that the way to have more is to produce less; that the way to move forward is to go backward. . . . And this in the direct face of all experience which dictates that we cannot have unless we produce; that we cannot enjoy possessions until we create; that no one has yet discovered the secret of turning scarcity into abundance by decree; that no one yet has found a way to pay dividends or wages out of recurring deficits.

The thirty-hour week will likely become an actuality even sooner than many of us anticipate. From the old practice of working from "sun-up to sun-down" we have gradually progressed to the point where forty or forty-eight hours is the standard. We will continue to move forward until we have found means for the production of both adequacy and surpluses in thirty, or even fewer, hours. But long experience dictates that such progression must come through development, not decree.

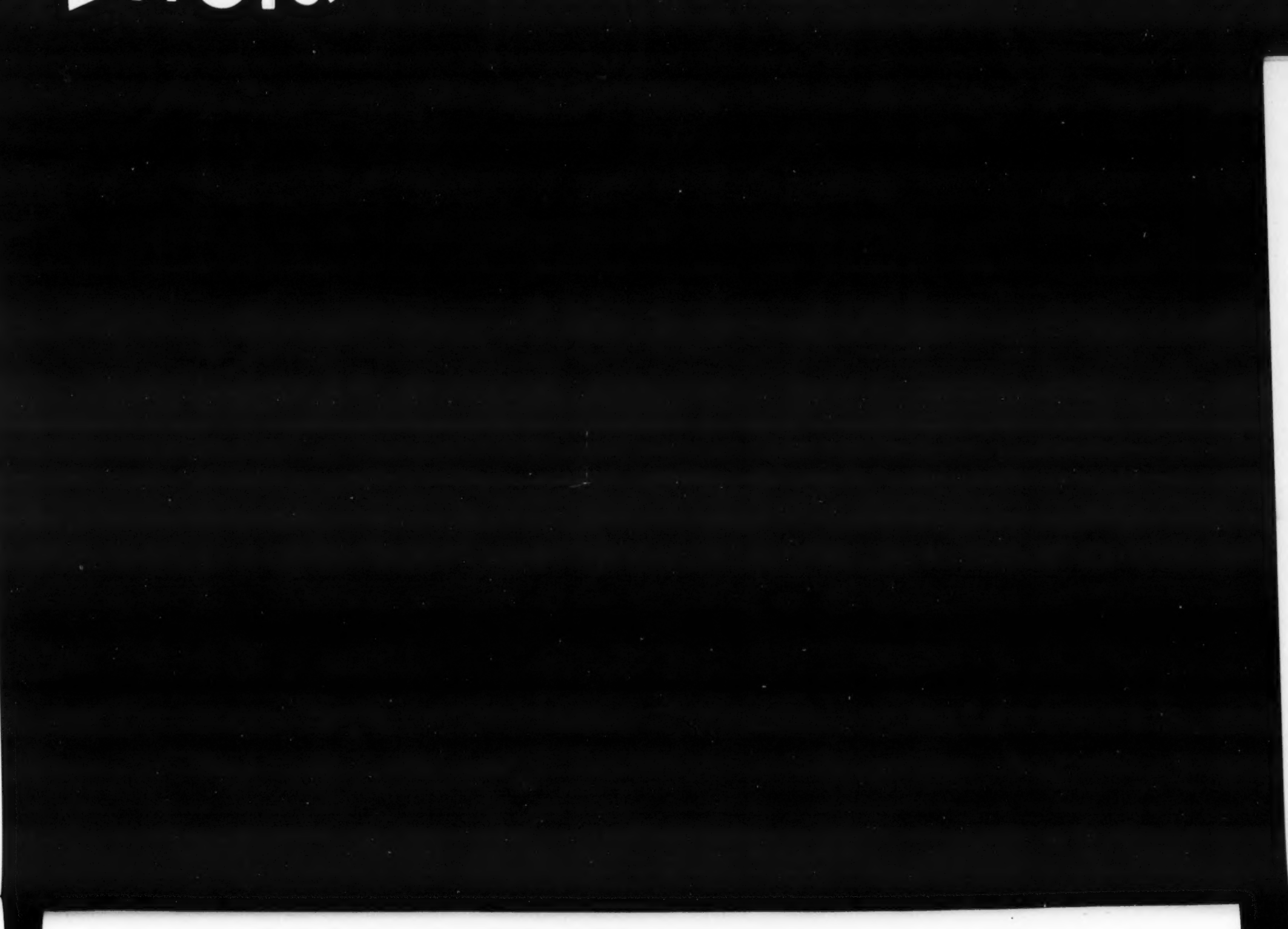
There is no repugnance to American ideals in the principle of the thirty-hour week. There is complete repugnance—diametric opposition—to American ideals in the manner by which this end is being sought. Emancipation did not immediately free the slaves. Prohibition did not prohibit. Deep-going social reforms are a matter for development and growth. A decree so drastic as the Black-Connery bill would upset industry to the point where the principle of the thirty-hour week would be seriously retarded if not entirely defeated.

A reduction of twenty-five per cent in the working time in the construction industry would not afford employment to all those formerly engaged in it. In the chemical industry, such a curtailment in working time would cause a serious labor shortage, with consequent curtailment of production. In the rayon industry, the same situation would obtain. And since this bill is offered as an unemployment relief measure, how can relief come through even temporary production curtailment?

We are seeking immediate recovery measures. But we will find no profitable recovery in a mandate which requires the shifting of Southern cotton mill hands to the machine-tool trade, Michigan furniture men to cigar factories in Virginia, or the pulling apart and redrafting of our whole industrial system.

The real measure of economic progress is to be found in creation—not destruction or limitation. The killing of little pigs, the plowing under of corn and cotton, the arbitrary limiting of labor's production, has not, does not, and will not raise the standards of living in this or any other country. We can provide the necessities of life (food, clothing and shelter) without great effort. What we need most are those things which have been classed as luxuries. Better homes, more comforts within those homes, more facilities to soften the asperities of existence. These can come about through the raising of the purchasing power of the individual, and increased purchasing power will not come through arbitrary extension of idle time, which will provide higher production costs but will not raise income.

The Black-Connery Bill which would impose a thirty-hour week upon all industries, will come up for consideration at the next meeting of Congress. The thoughts expressed in this article present only the author's opinion from general observations, and they should not be construed as having any application to the effect the thirty-hour week might have on the pulp and paper manufacturing industry. Readers of THE PAPER INDUSTRY *are invited to address communications to this magazine, setting forth either favor or disfavor of the thirty-hour week for the paper industry and their reasons for such opinions.—Editor's Note.*



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THE PAPER INDUSTRY

A MONTHLY EDUCATIONAL JOURNAL

Maintenance, Calibration and Use of Paper Testing Instruments[1]

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Abstract

This paper is a brief discussion of the chief points in the maintenance, calibration, and operation of common paper testing instruments. The instruments discussed are the psychrometer for measuring the hygrometric condition, the ream weight balance, the dial micrometer for measuring thickness, the tensile strength tester, the bursting tester, the tearing tester, and the folding endurance tester. Those phases of maintenance and calibration that can readily be attended to in any paper testing laboratory, especially those of importance most likely to be neglected, are emphasized.

IN EARLIER years the paper industry was concerned less than it is today with the exact measurement of sundry properties of its product, the quality being judged to a large extent by what went into the paper, how it was made, and by simple empirical tests that depended upon the intimate contact with and knowledge of paper shared only by experts in the art. The most important testing instruments were a practiced eye, sensitive fingers, a discerning ear—in short, the five physical senses—and a remarkable perspicacity, truly amazing to those of us who have not been brought up in the inner circle of the art. Although it is still necessary to depend to a considerable extent on keen and practiced senses in judging the quality of paper, recent years have witnessed a pronounced trend in the direction of the detached and impersonal measurement of the quality of paper through the agency of mechanical testing instruments. This seems to be a necessary corollary to the increasing complexities of commerce. Commercial transactions are usually completed with little contact between manufacturer and consumer, and it is found necessary to include in the commercial contract a set of quality standards couched in terms that will leave no room for misunderstanding between the contracting parties. The surest way to accomplish this end is to define the product bought and sold in terms of appropriate properties that can be reproducibly expressed in definite, numerical values. Present economic trends lay much emphasis on quality standards. This is the broadening field of the testing instrument. The development in this direction is necessarily immature, since the number of component properties necessary adequately to define the quality of materials in relation to their varied uses is very large, and many of these properties are difficult to express numerically in a manner that is adequate, unequivocal, and reproducible by all parties concerned. We have, nevertheless, gone so far in this direction that the present-day technician has access to a somewhat bewildering array of instruments that include hygrometers, psychrometers, micrometers, flexometers, extensometers, compressometers, densometers, porosimeters, photometers, colorimeters, opacimeters, and numerous other less formally labelled instruments for measuring stiffness, smoothness, hardness, permeability to fluids, etc.

The path of progress in any field is marked by the debris of inept and discarded forms. It is a corollary that many of the testing instruments offered us today will tomorrow fall by the wayside. Any experienced laboratory worker can recall numerous testing devices that have enjoyed a period of critical and hopeful attention, only to be discarded or replaced by better adapted forms. Perhaps there are some in his laboratory that have spent most of their existence merely in catching dust. There is always a welcome for any adequate testing aid, but too many offerings in this field have

1. Publication approved by the Director of the U. S. National Bureau of Standards of the Department of Commerce.

been premature and ill considered. More than an apt name is required to make a testing instrument. Rare indeed is the testing instrument whose pristine promise of solving all the problems of the paper technician has not been sadly weathered by the cruel test of time. The choice of effective testing aids from among a confusion of unappraised devices is a very real problem. The Technical Association of the Pulp and Paper Industry has done considerable service as a standardizing body in examining and making recommendations with respect to testing methods and apparatus, but its present facilities do not permit of a systematic and thorough appraisal of the many and varied testing instruments that are being urged upon the technician.

When we have found a good testing instrument, that alone does not insure an accurate test. Excellent though they may be, instruments are not infallible. There are always at least two elements of primary importance in a test—the instrument and the man—and, after all, the man is the more important. The potential accuracy of an instrument may be ever so great, but if the operator fails in maintenance, calibration, and correct operation, the instrument will still perhaps give a reading, but it will not be reliable and may lead one into many difficulties. It may be worth while to review briefly some of the more important considerations in the use of paper testing instruments. Since it is not feasible in a short space to discuss more than a few tests, the discussion will be confined to a few familiar types of testing devices which have the approval of the Technical Association.

Conditioning and Hygrometry

Most physical properties of paper undergo a change with a change in the amount of moisture contained in the paper, in consequence of which it is possible to measure the properties reproducibly only after the paper has been conditioned suitably at a definite relative humidity and temperature and maintained in this condition during the tests. The official testing methods of the Technical Association require that the departure from the standard of 70 deg. Fahr. and 65 per cent relative humidity shall not exceed 2 per cent of relative humidity. Now this requirement calls for a means of measuring the relative humidity that has an uncertainty of much less than 2 per cent. Therefore, before we can even begin to test paper, we must use an instrument in making a rather precise measurement of the condition of the atmosphere. It is generally felt that the most satisfactory instrument for the purpose is the ventilated wet- and dry-bulb psychrometer. It is not so generally understood, however, that to attain the necessary accuracy one must determine the wet-bulb depression to a tenth of a degree Centigrade. It is immediately evident that this can be accomplished only by meticulous care and use of the instrument.

Of first importance, of course, is the calibration of the thermometers against a precise standard, so that we can apply any necessary corrections to the readings to obtain the true temperatures. The proper bulb covering for the wet bulb is very important. Its purpose is to cover the bulb with a thin, continuous layer of water that by evaporation will give the maximum lowering of temperature. If it were possible to maintain such a film without the fabric covering or "wick," it would be best to dispense with it altogether. Hence, the fabric covering should be thin and close-fitting. An old, clean, cotton handkerchief is very good material for the purpose. A piece just wide enough to wrap around the bulb and overlap slightly should be applied wet and fitted snugly. It is tied with thread above and below the bulb, and any superfluous material is trimmed off. This must be done with *clean* hands. The wet-bulb covering is saturated with distilled water and the two thermometers are ventilated at a minimum velocity of 10 feet per second with the air whose humidity is to be measured. In one form this is done by whirling the thermometers in the air, and in another by drawing the air over the bulbs with a fan. A failing of some of the latter type is an insufficient velocity of the air stream, and of the former the difficulty of reading the wet bulb at its lowest point because of having to bring it to rest while making the reading. A good psychrometer is very sensitive to extraneous sources of heat and moisture. One should stand well away from the psychrometer, making the readings with the aid of a hand lens to avoid the influence of heat or moisture from the body, particularly from the breath. Even with this precaution it has been observed that significant error may result if ventilating currents within the room first pass over the body before reaching the thermometer bulbs. The psychrometer should be so placed in the room that such currents will pass the psychrometer before reaching the observer, and so that it will sample air at about the height at which the conditioning and testing is done. Several readings of the two thermometers should be taken, until successive ones agree. It will take perhaps a minute or two after ventilation of the thermometers begins before the maximum wet-bulb depression is attained. If one waits too long, however, the drying out of the bulb covering will result in too high a wet-bulb reading. After the readings of the thermometers have been made, one must convert them to the corresponding relative humidity with reliable tables or graphs that can be read in tenths of a degree, such as the Smithsonian Meteorological Tables.

The psychrometer is a fitting introduction to a discussion of paper testing instruments because it illustrates very well the responsibility of the laboratory technician. Paper testing instruments at their best are none too good, and their proper maintenance, calibration, and operation can scarcely be too often or too strongly stressed.

The recording hair hygrometer has been found to be a very convenient means of obtaining a continuous, autographic record of changes in relative humidity. The chief points of maintenance are protecting the hairs and keeping them clean. However, the hair hygrometer is not a suitable standard and must be adjusted to agree with the readings of a wet- and dry-bulb psychrometer. The adjustment should be verified against the psychrometric readings at least once or twice each day. Instruments can be had which record both humidity and temperature on the same chart.

Having used the psychrometer to make sure that the atmospheric conditions in the testing room are correct, we shall now consider some of the requirements and means of attaining reliable results with a few approved types of testing instruments.

Ream Weight

Since ream weight, or basis weight, is expressed as the weight of a given area of paper, two types of apparatus are required for the measurement: A balance for weighing one or more sheets, and a scale for measuring the length and width of the sheets weighed. Two types of balances are commonly used: those having knife-edge pivots, and those in which torsion members take the place of the knife-edge pivots. The scales of the balances are usually graduated for convenience to indicate the weight in pounds of 480, 500, or 1,000 sheets, each of which has an area equal to the total area of the specimen weighed. The indicated weight is therefore 480, 500, or 1,000 times the actual weight of the specimen being weighed. When one is calibrating a ream weight balance the available weights are usually the metric weights from a chemical balance. Hence to determine the proper metric weights to put in the pan, one divides the scale reading by the number of sheets to which that scale corresponds and then multiplies by 453.6 to convert the reading to grams. For example, if one is calibrating the 500-sheet scale, the verifying weight for the 50-lb. mark would be $\frac{50 \times 453.6}{500} = 45.36$ grams. For the 10-lb. mark the verifying weight would be 9.07 grams, for the 20-lb. mark, 18.14 grams, and so on for the whole scale. The first point to verify is, of course, the zero point. The balance is levelled and adjusted, if necessary, until it reads zero without anything in the pan. The unit graduations on the scale should be far enough apart that one can readily estimate the readings to tenths. If the indicated reading for any verifying weight is off the mark by as much as a tenth of a pound, a correction will be necessary to make it accord with the precision of the T.A.P.P.I. standard, since a tenth of a pound in the middle region of the scale corresponds roughly to the requirement of the Technical Association standard that the weight be determined with an uncertainty not greater than a quarter of a per cent. The actual weight corresponding to a tenth of a pound indicated weight on the 500-sheet scale is a little less than a tenth of a gram. The balance should respond readily, therefore, to an increment of one-tenth gram added to the pan, showing the sensitivity to be great enough to make the required weighings possible. A place should be selected for the balance where air currents will not affect the readings. It is advisable to weigh enough paper to give a reading on the upper half of the scale.

Since this type of balance indicates the weight of a ream made up of sheets each having an area equal to the total area of the sheet or sheets actually weighed, one must determine the total area of the weighed specimen and convert by simple proportion to the desired trade size or standard size. For measuring the length and width of the sheet or sheets weighed, a steel or wood scale of reputable make, graduated in hundredths of an inch, is found suitable. Such scales may differ in length by as much as a hundredth of an inch per foot. To yield results of the accuracy required by the T.A.P.P.I. standard, the sheets weighed and measured should all be at least 8 inches wide. A magnifying lens will be required to read the scale. Both dimensions of each sheets should be measured twice, near opposite edges, to take care of accidental non-parallelism of opposite edges.

From the ream weight and the thickness, which will next be discussed, one can calculate the density, the specific gravity, and the specific volume of the paper. Since ream weight is the weight of a unit area, the density is the ream weight divided by the thickness when these quantities are expressed in appropriate units.

Thickness and Bulk

The precise measurement of the thickness of a sheet of paper is rather difficult for several reasons. In the first place the thickness of a sheet of paper is not a very definite thing because of the rough surface, and depends a good deal on how it is defined. Then, the measured thickness depends on how much pressure is applied during the measurement. The Technical Association is now working toward the establishment of a definite pressure to be used. Finally, the thickness tester used is called upon to be a rather precise instrument. It is a pretty good micrometer that will reproduce its readings time after time to a ten thousandth part of an inch. This much uncertainty, when one is measuring a sheet five thousandths inch thick, amounts to 2 per cent. For paper testing the dial micrometer is usually preferred because of its convenience. The T.A.P.P.I. standard for thickness measurement requires that measurements for thickness less than a hundredth of an inch be made with an uncertainty of not more than one ten thousandth inch. Commercial leaf gauges are not accurate enough for use in calibrating a micrometer to this degree of accuracy. The average paper testing laboratory is not properly equipped to calibrate a micrometer. The calibration should be done by a standardizing laboratory equipped with gauge blocks the thickness of which is known to one part in a hundred thousand. The measurement of the pressure that the micrometer applies to the sheet during measurement also requires special equipment. The parallelism of anvil and foot of the micrometer can be determined with an eighth-inch steel ball fastened firmly in a handle. The ball is moved about to various positions between the two surfaces, and all the readings must agree to within 2 ten thousandths inch. The chief precautions in measuring the thickness of paper with a dial micrometer are to make sure the pointer reads zero when anvil and foot are in contact, and to lower the foot very gently on the paper. Since paper is compressible erratic results can be obtained by pounding the paper with the micrometer foot.

The average thickness in bulk can be measured with much greater precision than the thickness of a single sheet, since many sheets are used at once. The average thickness in bulk is in general less than the average thickness of the single sheets, because the surface irregularities nest into one another when the bulk measurement is made. If it is necessary to know about the uniformity in thickness of the sheets, one must make the measurements on single sheets.

Tensile Strength and Stretch

The pendulum-type of tensile tester is usually considered the most reliable type of instrument for testing the tensile strength of paper. The displacement of the

pendulum against gravity measures the tension on the specimen. The apparatus is fairly sensitive, and yet sturdy. The calibration is simple, the maintenance requirements are few, and the instrument is probably the most reliable of strength testing equipment used in the paper laboratory.

The pendulum is mounted on ball bearings which require occasional oiling so that the pendulum will move so freely that it will respond to a change of a few grams in the load applied. It is necessary to level the instrument carefully in both directions so that the pendulum will move throughout the length of the scale without touching anything, and so that the pointer will indicate zero with nothing in the clamps. It is also necessary that the pawls that hold the pendulum in the position attained when the paper breaks shall have as little friction as possible. A little oil and occasional cleaning should keep them in good shape.

The calibration is made in much the same way as that for the ream weight balance, for, after all, the tensile tester is only a balance. Accurate weights corresponding to the major scale divisions are suspended from the clamp that is attached to the pendulum. This can be done with strong thread or string, the weight of which is negligible in comparison with that of the suspended weight. The pawls can be wedged out of contact with the rack on the scale with a bit of paper, the weight of which is negligible in comparison with that of the pendulum. The pendulum should be moved to a scale reading lower than that corresponding to the suspended weight and brought to rest from movement up the scale, in the direction it would move during a test. This will take care of the small friction in the bearing. If there are corrections to be made to the scale readings, a table should be made out and kept in a convenient place. The chief additional points to be observed in using the tensile tester are to cut the strips accurately to the proper width (15-mm width seems now to be generally used), and to clamp the strip evenly and smoothly at both ends so that the tension will be applied uniformly across the whole width. It is customary to express the tensile strength of paper as the load or force required to break a strip of a certain width, rather than as the force required to break a unit cross section, as is the custom with structural materials, because paper can be used only in the thickness in which it is furnished. The results are affected to some extent by the length of the strip used and by the time consumed in applying the load. The Technical Association is now trying to standardize these factors more satisfactorily.

Stretch is most commonly measured as the total stretch up to the rupture of the specimen, and is measured by an attachment on the tensile tester at the same time that the strength is measured. The stretch measurement as commonly made does not seem to be as reliable as the strength measurement. Instruments are available, however, that record autographically the whole of the load-stretch curve, and should give more accurate and more significant data. The measurement of stretch probably deserves more attention than has yet been accorded it in the paper industry. Stretch is probably the most signficant factor in the property of toughness of paper.

Bursting Strength

Bursting strength testers are so common, so familiar to all, and so much has been written about them that it is somewhat presumptuous to say anything more on the subject. Yet perchance familiarity may breed indifference to the limitations of the tester. There are many factors beside the strength of the paper tested that can affect the results. Such things as changing diaphragms and replenishing the glycerine are requirements too commonplace to dwell upon, but emphasis should be reserved rather for two factors, the clamping force and the pressure gauge.

If the paper slips during the bursting test the effect is the same as if we had in some way increased its stretch, and the bursting pressure goes up out of all proportion to the apparent increase in stretch. Bursting strength is related in a fairly definite manner to tensile strength and stretch and we can predict how much the apparent brursting strength should increase as a result of a small amount of slipping. Other things being equal, the paper that will push up the highest before popping will have the highest bursting strength. That small differences in stretch or slipping will make large differences in apparent bursting strength is related to the principle that a tightly stretched chain, if paid out ever so little, will sag considerably, or a hair bundle in a hygrometer while changing a very small amount in length will move sidewise with the indicating mechanism attached in the middle of the bundle to produce a much magnified movement of pointer or recording pen. It is probably this sensitivity to small differences in stretch that is largely responsible for the hold on paper testing that the bursting strength tester has maintained throughout the years. The test might be considered as a measure of the touchness of paper, since it is compounded of both strength and stretch and is particularly sensitive to stretch. However, if this "stretch" comes about in part by the slipping of the paper, the resulting high bursting strength is obviously fictitious. For example, if a paper that normally stretches 1 per cent before breaking is allowed to slip an additional 1 per cent during the bursting test, we can predict that the bursting result will be 33 per cent higher than if no slipping occurred. We see from this the great importance of holding the sheet so that it won't slip. Probably the best way to tell if the sheet is slipping under the clamp is to watch the edges. If the edges of the sheet move, especially in a wavy manner, we may be sure that the test is being spoiled by slipping. The trouble can usually be cured by putting one or more washers under the clamping spring, or putting in a stronger spring. The metal clamping faces now generally used hold better than the rubber facing formerly used, probably because the rubber flowed appreciably under the clamping conditions, whereas the metal does not.

Although the bursting strength tester is a very sturdy apparatus, the pressure gauge is rather delicate and requires corresponding treatment. Primarily designed for static conditions, it is subjected to rather severe treatment when the pressure is repeatedly built up rapidly and released suddenly. It requires rather frequent calibration. This can be done in the laboratory with a dead-weight gauge tester. The gauge tester

should be preferably fitted with a valving device which will make the needle move toward equilibrium at about the same rate as in an actual test of paper. The gauge should be attached to the gauge tester in the same position, usually the horizontal, that it has when attached to the bursting tester. Everyone is familiar with the effect that one can get by a change in the rate of operating the tester. The pressure should be built up at a fairly slow and uniform rate. Probably the chief fault with present day bursting testers is that they operate too fast, and the pressure is built up very rapidly toward the end.

Resistance to Tear, or Tearing Strength

Several types of tearing testers have been devised and advocated from time to time, but the one most in vogue at the present time is the Elmendorf type. Since the test is empirical and depends on how the force is made to operate upon the paper, different types of tearing tests can scarcely be expected to agree. The Elmendorf type has been standardized and is in extensive use. The scale requires very infrequent calibration. In fact, once in the life time of the instrument is sufficient if the friction is kept small and substantially constant, and if nothing about the instrument is substantially altered. Two or three methods of calibration have been published, and it will not be necessary to go into details here. There is, however, a simple routine of adjustments that should be gone through frequently. First, see that the clamps are in line when the sector is resting against its stop. Make any necessary adjustment by moving the sector stop and clamping it firmly. Second, level the instrument until the mark on the middle line of the sector is opposite the one (usually the contact edge) on the sector stop. This insures that the sector pendulum starts falling from exactly the same height that it did when calibrated. Third, set everything for a test except that nothing is put in the clamps. Hold the sector stop down for a complete cycle and see if the pointer reads zero. If it does not, adjust its stop until zero reading is obtained. Fourth, leave pointer on zero and operate as before. Because the pendulum this time does not have to move the pointer around against its bearing friction, it will rise a little higher on its forward swing and kick the pointer a little beyond zero (off the scale). The amount of this kick measures the pointer friction and should not be greater than 3 gram divisions on the scale. It can be reduced if necessary by cleaning and oiling the bearing. Occasionally, also, one should test the friction of the sector ball bearing. To do this, select a point on the frame behind the sector and an inch to the right of the edge when it is resting against its stop ready for a test. While the stop is held down, the pendulum should swing at least twenty times before the point can no longer be seen at the end of an oscillation. This will correspond to friction equivalent to half a gram or less on the scale. The next thing to make sure of is that the tearing distance is exactly 4.3 centimeters.

Perhaps the most confusing thing about the tearing test is the conflicting custom in designating the direction tested. Some will report machine-direction tearing strength when the line of tear is in the machine direction, while others will call this the cross-direction tearing strength because it is the cross-direction fibers chiefly that are being torn or broken. The latter is the logical designation and the only way that we can make the directional designation for the tearing test conform to that of the other strength tests and to the T.A.P.P.I. standard for directional designation as given in their method T409M.

Folding Endurance

Two types of folding endurance testers, the Schopper and the M.I.T., are in fairly common use. The results from the two do not agree, since the stresses are applied in different ways. The first has had the sanction of the Technical Association for some years, and the A.S.T.M. has adopted a standard method covering the second. The folding test is more sensitive to experimental variables than other common tests and the folding testers require a disproportionate amount of attention.

Schopper Type—This type is particularly troublesome to keep in good shape because the results are influenced by very small changes in alignment and friction in the guide rollers. Recently, jewelled bearings are being furnished for these rollers and should help to minimize this difficulty. The adjustment of clearances and renewing of bearings is an instrument maker's job. The calibration is most conveniently done with the aid of a bell-crank lever which has been described in a publication by the National Bureau of Standards. The springs, while under tension of 1 kilogram through the aid of this apparatus, are adjusted so that the displacement is equal to that for the maximum throw of the crank when a specimen is in place. The same device is used to measure the friction in the roller bearings, which is kept below the arbitrary figure of 100 grams equivalent tension. Particular attention must be given to cutting the test strips to exact width and clamping them in the tester evenly and smoothly.

M. I. T., or Bush Type—This type of folding endurance tester has no rollers to get out of order. The test strip is suspended from a plunger that compresses a calibrated spring to give the proper tension. The other end is fastened in an oscillating clamp, the jaws of which are the folding blades. The chief difficulty thus far with the instrument has been in standardizing and reproducing these folding edges. The calibration is very simple. The plunger is provided with a flattened head, or platform, on which weights can be placed that measure the tension on the specimen. A displacement scale is provided that can be calibrated, or one can compress the spring with the proper weight each time a specimen is clamped in the tester. Friction in the plunger bearing is measured by the increment of weight that will cause movement when the spring is compressed by the calibrating weight. This increment should not be greater than 25 grams. The two jaws separated by the paper can not have their edges exactly at the center of rotation. The slight eccentricity produces an alternate compression and extension of the spring as the clamp rotates, and consequently a slight periodic fluctuation in the tension on the specimen. This is measured by the amount of the periodic plunger displacement and the increment of weight required to produce the same displacement. This should not be greater than 35 grams.

Folding endurance testers are often maligned because the results on the individual strips in a sample differ so

much from the average. The tester as a consistent mechanism probably has very little to do with this circumstance. It is due rather to the fact that we test a mere hair line across each strip, scarcely a hundredth part of the area of the strip. This small area is picked and fixed at the center of the strip. The tester does not have a chance to pick out the weakest spot or an average strength. The small area tested is just as apt to be the strongest as the weakest. Considering the variation in the structure of paper, as anyone can verify by looking through a sheet, it is not surprising that such a procedure would give a large spread in folding values. In fact, it is rather amazing that the folding value (average of ten tests) obtained by testing but a small fraction of a square inch of paper from each lot is sufficiently reproducible to be used as a basis for accepting or rejecting the shipment. When considered in this light the folding tester is perhaps a more faithful servant than it has been given credit for being. We must hasten to admit, however, that there is a basic fault in the test when it will not permit of a more representative test within a reasonable time. There must be some better way to test the ability of paper to survive creasing and handling, and we may be sure that in time a better means will make its appearance.

It has not been possible in this short space to consider very many kinds of testing instruments, nor to discuss them in much detail.[2] The brief discussion may have served, however, to arouse the suspicion that the value of results obtained with paper testing instruments is pretty much in proportion to the amount of intelligent care, faithful calibration, and conscientious operation that have been accorded them.

Paper testing is yet very young. Every year brings its offering of new testing devices. This process will probably go on at an accelerated pace because the need is great. Paper testing must, however, become less empirical and more scientific, less rudimental and more precise. There are today a great many testing devices of all degrees of merit knocking at the door of the paper testing laboratory. In the years to come these, and others that will meantime be developed, will have to go through a gruelling process of trial and appraisal to demonstrate their fitness to survive. The process is necessarily inexorable, as in nature, but out of it all will eventually emerge a body of testing aids, adapted to the peculiar requirements of paper in its varied uses, that will give to paper testing a degree of stability and dignity comparable to that in the older fields of materials testing.

2. Further detailed information is contained in the standard testing methods of the Technical Association of the Pulp and Paper Industry, 122 East 42nd Street, New York, N. Y., and in research reports of the National Bureau of Standards on which the present standards are largely based.

What Happens When Ink Meets Paper?

By Vincent S. Smith[1]

TO APPRECIATE the subject of ink penetration it is perhaps better first to consider the several paper surfaces. Practically every paper, always excepting the grades given a special coating, possesses a broken surface. In such papers as antiques this is easily discernible but in others, particularly those which have been calendered, it is not so readily appreciated, nevertheless, this peculiarity of the surface is always present.

This is important, for it has to be remembered that when the ink is impressed upon the paper, two actions operate, the ink sinks into the paper and it dries by oxidization. Thus the rougher the surface of each sheet the more the possibility of air getting between the sheets and oxidization operating.

The chief action of the addition of size to paper is to join one fibre to another and consequently present the sheet with a fairly solid surface and one that will resist ordinary writing ink. There are two methods of sizing papers, the process confined to the better class writing papers known as tub-sizing, and the more common form, termed engine-sizing, an operation carried out with practically all printing papers and the lower grades of writings. The chief medium in this latter process in rosin.

A peculiar characteristic of rosin is its resistance to water consequently when added to writing papers the sheet is rendered impervious to writing ink and the inked characters do not spread. But while rosin will resist water, it has the opposite effect upon oil. The latter is one of the chief constituents of printing ink, therefore, the printer will appreciate that the penetration of ink into paper is aided by the acceptance of this oil by the rosin. Thus the amount of rosin present connecting the paper fibres should help to determine the degree of printing ink penetration. At the same time, a small quantity of the ink should be received by the paper fibres.

The majority of papers contain some form of loading, the principal loading medium being china clay. This clay again acts as an absorbent agent, and where the loading is present in any appreciable degree the paper is rendered more acceptable to printing ink. But offset against this advantage is the calendering process, by means of which the paper surface is given a more polished finish.

Modern printing, in many instances, demands a highly finished paper, and one of the chief effects of this calendering process is to bring the paper fibres closer together on the surface, and thus diminish the proportion of inter-fibre sizing and at the same time, with a more polished surface, tend to decrease the amount of air which will be retained between each sheet.

Finally, yet another and important factor enters into this subject, that of the beating of the paper fibres. Again the numerous qualities of papers, offering differing characteristics of strength, feel, finish, etc., necessitate varying degrees of beating.

This brief explanation of the ink penetration of paper discloses that at least six factors enter into this action; the treatment of the paper fibres, the sizing, loading, finishing of the paper, the printing ink and the atmospheric conditions of the machine room. Small wonder that we still await the answer to that simple question: "What *does* happen when ink meets paper."

[1]Abstracted from an article in *Printing*, October, 1934.

Coating Brushes . . . . Their Care and Maintenance

E. G. MILHAM
Watervliet Paper Company

THE coating of paper involves the application of an even layer of a mixture of pigment and binder to a suitable sheet of paper, commonly called raw stock. The mixture of pigment and binder, or coating, may be put on the paper in a number of ways. It may be applied by spraying it onto the sheet with a series of specially designed paint guns. It may be trowelled on by means of moving rolls provided with suitable scrapers. It may be rolled on and smoothed off with a specially designed air doctor, or it may be applied by means of brushes. The brush method was the first to be used and at the present time a large proportion of the better coated papers are coated by means of brushes. The spray and trowel systems offer very distinct advantages; but the inherent difficulties in the matter of control have apparently more than outweighed the advantages in the case of the higher grades of coated papers.

Brush Coaters

When the brush coater is used, the uncoated sheet of raw stock is drawn tightly over a revolving cylinder and the coating is applied by means of a revolving cylindrical brush running in a direction opposite to the direction of travel of the paper. The sheet then passes over a smooth rubber belt or apron and the coating is leveled out by means of a series of oscillating flat brushes as shown in the accompanying line diagram (Figure 1).

In the operation of the coater, the coating solution in pen *A* is picked up by the revolving color roll *B* and carried to the round brush *C* which, in turn, transfers it to the paper which is tightly drawn over the drum *D*. The scrub brushes *E* and *F* are fairly stiff and operate at about 250 to 300 strokes per minute. They have a stroke of about 1.3 inches. After leaving the drum, the paper passes onto the apron *G* which also serves to pull the sheet through the machine. The apron operates over a perfectly smooth bed *L*. The flat brushes *H* and *I* are made of hair which is more flexible than that in *E* and *F* and they move with somewhat shorter, quicker strokes than the latter. Brushes *J* and *K* are made of the very finest quality badger hair and move with fast, short strokes. All these brushes are built by hand labor and are, of course, very expensive. The round brushes cost approximately $2.50 per inch of width, the coarse brushes about 30 cents per inch and the badgers $1.25 per inch.

Construction of Brushes

Round brushes are made by tying hairs about 4 inches long into tufts about ¼ inch in diameter. These tufts are then cemented into holes bored in a solid wood core and wedged in by means of small wooden pegs. After the cement has hardened, the brush is trimmed to a perfect cylinder by means of a specially built trimming lathe. The flat brushes are made in essentially the same way as the round brushes except that a flat piece of wood is used instead of a cylindrical core.

Of course, it is extremely important that the brush manufacturer take proper care in the matter of selecting and grading the hair used in his brushes and that he prepare the hair in such a manner that the bristles

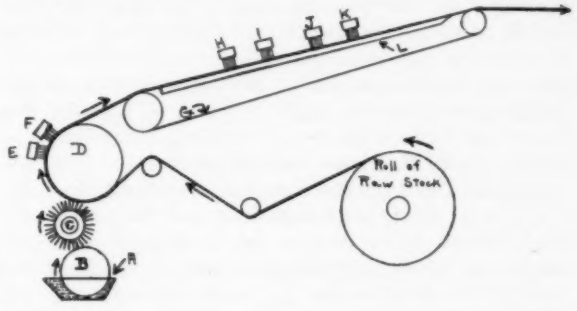


Figure 1

throughout the entire brush will be of the same hardness and stiffness. A carelessly made brush can cause considerable trouble on a coating machine and will make it impossible for the operator to produce a first class sheet of coated paper.

Brush Troubles

Troubles with round brushes can be summarized under six heads as follows:

1—Brushes wearing unevenly
2—Hairs breaking off
3—Hairs coming loose from core
4—Wood core opening up or checking
5—Brush filling up with hard color at the base
6—Brush not transferring coating evenly

Troubles with flat brushes may be summed up under five heads as follows:

1—Wood back warping out of shape
2—Wood back checking and opening up
3—Hairs coming loose
4—Hairs breaking off at base
5—Hairs losing resiliency or life

The above named troubles are very common in coating mills using the brush type coaters and the brush manufacturers have been blamed pretty generally for most of the difficulties. Curiously enough, practically none of these common troubles may be justly laid to the brush builder. The coating mill operator brings most of them upon himself through failure to use reasonable common sense in the matter of properly caring for the brushes.

The following suggestions are given in the hope that they may help coating mill operators to minimize some

of these annoying and expensive troubles. The common troubles with both round and flat brushes will be discussed briefly, one at a time.

ROUND BRUSHES

Uneven Wearing

The average brush coater runs at about 220 feet per minute and at this paper speed, the rim of the round brush travels at about 350 feet per minute in a direction opposite to that of the paper. The actual sliding speed of the brush relative to the paper is the sum of the brush speed and paper speed or 570 feet per minute. This is equivalent to a slip of 6.5 miles per hour or 155 miles per 24-hour day. In addition to sliding on the paper, the brush also slides on the revolving color roll which travels at a peripheral speed of about 50 feet per minute in a direction opposite to that of the round brush. This makes the total slip between the brush and the color roll 400 feet per minute, 4.5 miles per hour or 109 miles per 24-hour day. It is thus seen that the *total slip* of the brush on *both* the color roll and the paper is 11 miles per hour or 264 miles per 24-hour day. With these figures in mind, it is easy to see why it is important to keep the brush adjusted evenly with respect to both the drum and the color roll. It is also important that both the drum and color roll be smooth and true. Gritty materials in either coating or raw stock should be avoided as far as possible and, most important of all, the brush should be examined frequently for wear so that any avoidable sources of excessive wear may be corrected before they go too far.

Hairs Breaking Off

Properly prepared round brush hair is soft and pliable and should remain in this condition for many months if given careful treatment. The greatest enemies of hair are heat and alkali. If the round brush is allowed to go too long between washings, it fills up at the base with a hard alkaline material which requires drastic treatment with *both* heat and alkali when the brush is finally washed. This sort of treatment takes the resilience out of the hair and makes it as brittle as glass, with the result that the hairs begin to break off at the core and the brush builder is blamed for turning out an inferior product. Trouble of this sort is easily avoided if brushes are washed in water not over 130 deg. Fahr. and if care is taken to give them no more rubbing and scrubbing than is actually required to get the foreign material out of the hair.

Hairs Coming Loose

Hairs are held in place in the core of the round brush by means of waterproof cement. It often happens that when a brush is frequently taken out of service, the core becomes excessively dry and the cement becomes brittle. When this happens, the hairs are almost certain to come loose from the core and cause considerable trouble. This sort of difficulty can be avoided by using care in washing as mentioned above and by keeping the brush moist when it is retired for short periods. Of course, it goes without saying that the brush maker must use a suitable cement and properly fill each hole in the core with the proper amount of cement, hair and wedging.

Cores Checking and Opening Up

The wood cores for round brushes are carefully selected and seasoned by the brush maker and should give no trouble during the life of the brush, if properly cared for. However, if the brush is allowed to dry out frequently after being put into service or is dried at too high a temperature, there is grave danger of the core checking. Of course, when the checks get sufficiently large, they allow the tufts to come loose, thus rendering the brush unfit for further service. Obviously, the remedy for this is to keep the brush moist when taken out of service for short periods or to dry it out very carefully when retiring it for a longer period. Care should also be taken to store the brush in a cool and moderately dry place before putting it into service. Destructive elements such as moths, fumes, dust, etc., should be guarded against.

Filling Up at Base

It is an exceedingly bad practice to allow a round brush to fill up with hard coating at the base because this is the main cause of hair breaking off, uneven wear, uneven pick-up and contamination of the coating. As a rule, trouble of this kind can be traced to lack of thoroughness in the matter of washing the brush when it is new and the hairs comparatively long. The difficulty is also experienced if the brush is allowed to go too long between washings or if the brush is built excessively full. The remedy for filling up is frequent thorough washing especially when the brush is new. Excessive fullness in the brush makes it very hard to wash and since this fullness is of no particular advantage, it is well to specify minimum fullness in purchasing brushes of this type.

Not Transferring Coating Properly

Since the amount of coating applied to the paper depends entirely on the quantity transferred from the color roll by the round brush, it is very important that the brush function perfectly in this matter at all times. If the brush has worn unevenly it will coat unevenly. If it varies in stiffness due to being partially filled up at the base it will not transfer coating uniformly. If it is contaminated in spots with greasy materials which repel coating it will not coat evenly. Cleanliness, intelligent watchfulness and careful re-trimming, when necessary, will eliminate most troubles of this kind.

FLAT BRUSHES

Backs Warping

Warping in a flat brush is pretty serious because it will not permit the operator to get an even set across the width of the sheet being coated. The wood backs are carefully selected and seasoned before being made up and it rarely happens that the responsibility for a warping failure can be justly traced to the brush maker. In order to avoid warping, brushes should be stored in a reasonably cool place having minimum humidity variation. Brushes in service should be washed as often as necessary and with a minimum of water. Wetting of the back and prolonged soaking should be avoided. The temperature of the wash water should never be over 140 deg. Fahr. Brushes should be dried reasonably slowly at a temperature not over

165 deg. Fahr. Care should be taken to see that during the drying the wash water can run *away* from the back rather than toward it. After drying, the brushes should be stored, hair down, in a place having a temperature not over 90 deg. Fahr. and having minimum variation in humidity.

Checking of Wood Back

Checking is even more serious in a flat brush than in a round brush. It is due almost entirely to excessive heat in drying and excessive soaking during washing. If the precautions listed under "warping" above are carefully adhered to there should be little or no trouble with checking.

Hairs Coming Loose

If a brush is soaked too much in washing or heated too much in drying it will cause the cement holding the tufts to become brittle and lose its waterproof qualities. Eventually this will allow individual hairs to come loose from the tufts or will even allow whole tufts to come loose from the back. The same thing will happen if the back develops checks. Failures of this kind are very serious on account of the relatively large amount of paper spoiled before the trouble is detected. If brushes are properly built, carefully treated and intelligently watched there should be very little trouble of this kind.

Hairs Breaking Off

In case a harsh alkali is used in washing brushes or if an excessively caustic coating is being used, it often happens that the hair near the base of the brush gets badly encrusted and becomes very brittle. This is very disastrous because when hairs become brittle, they break off one or two at a time and remain on the coated sheet. When the sheet is put on the calender, the broken piece of hair is almost certain to come loose from the sheet and stick to the calender roll, thereby spoiling considerable paper by imprinting the hair into it at every turn of the roll. This spoilage continues until the calender operator detects the presence of the hair and removes it from the roll.

Responsibility for brittle hair can usually be laid to inattention or thoughtlessness on the part of the man in charge of the coating department. If the hair is treated in a manner to preserve its original springiness it will not become brittle and will not break off.

Hair Losing Resiliency or Springiness

Normally, the hair in a flat brush should have sufficient life to enable it to recover quickly after slight distortion. This life, or springiness is present in the hair when the brush is built and is often greatly diminished or entirely destroyed by the coater operator through excessive heat or excessive incrustation. For best results, no brush should be exposed for even short periods to temperatures over 160 deg. Fahr. and should not be exposed for longer periods to temperatures over 110 deg. Fahr. Brushes should be washed thoroughly in water containing minimum alkali. In case only hard water is available, great care should be taken to remove as much of the rinsing water as possible before drying the brush. This precaution will minimize carbonate incrustation although it will not eliminate it. A flat brush washer as shown in Figure 2 is very helpful in prolonging the life of the hair in flat brushes.

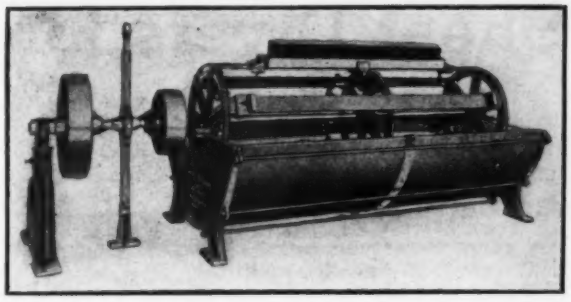


Figure 2

Conclusions

In conclusion, the following summary may be drawn:

1—Brush failures are exceedingly expensive as well as annoying.

2—Brushes cared for in a sloppy manner can be a major source of operating trouble on a coating machine.

3—Practically all brush failures may be attributed to indifferent care on the part of the coating mill man and not, as is commonly supposed, to the brush builder.

4—Intelligent washing and drying of brushes is of utmost importance.

5—Care must be used in storing brushes both before and after putting them in service.

6—Brushes can be the coating mill man's best friends. If treated like friends, they will serve like friends.

◆ ◆ ◆

Starch from Waste Sweet Potatoes

According to the results of experimental tests made by the National Bureau of Standards, sweet potato culls offer some possibility as a source of starch for sizing paper and for paper adhesive. The culls constitute a huge waste in the southern states and the Bureau of Standards and the Bureau of Chemistry and Soils are jointly endeavoring to find ways of making profitable use of them.

Cornstarch and cassava starch are used extensively in book papers to improve their printing quality. The Bureau of Standards made and tested wood-fiber book papers sized with these starches and with sweet potato starch and the latter compared very favorably with the others. The same kind of experiments are now being made with rag-fiber papers.

Dextrin made from cassava starch, which is imported, is used as an adhesive for postage stamps, envelopes, labels, and other paper products, and for this purpose it is superior to the present cornstarch dextrins as it has better adhesive quality. Gum made from sweet potato dextrin, however, was apparently equal to cassava gum in all respects.

It is planned to extend these semi-commercial tests to trials on a commercial scale as soon as sufficient sweet potato starch is made available through production of it in a commercial plant now being built.

Sheet Dryers for Binder's and Fiber Board

By CURT WEIL

THE drying of binder's and fiber board has not always involved a knowledge of heat technics and heat economy. It was common practice in earlier days, and in rare instances even today, to lay mechanically dewatered board upon the mill lawn to dry. Such board, turned over once or twice during the drying period, was tenacious, and flat-laying, and could be calendered without special treatment.

Natural drying did not sear or crust over the surface of the board. Rather it permitted sufficient time for the heat to penetrate the fiber mass so that evaporation proceeded from the inside to the outside. With the diminution of moisture content the drying continued even more slowly until a point was reached beyond which it was impossible to go. This point, that of air dryness, produced a board with a moisture content of around 10 to 12 per cent.

Although this method of drying produced a quality product, the cost of transporting, laying and turning of the board became too expensive and losses incident to handling were too high. Therefore, means were devised to dry the board mechanically.

Dryers developed for this purpose may be broadly classified into periodically or continuously operated units and into dryers that dry the board in a hanging position and dryers for drying in a laying position.

Among the periodically working dryers that have been developed is the chamber dryer. This dryer originally consisted only of a brick chamber equipped with heating coils installed near the floor and an exhaust shaft through which the air could escape. Board to be dried was hung in it, the door closed, steam valve opened and the moisture released from the board exhausted from the chamber by natural draft of the warm air.

Temperature variations and poor circulation of heat within such a dryer caused the borders of the board to dry first and the centers later. A partially dried board on test might show a moisture content of 5 per cent along the borders and 40 per cent in the center. Yet drying had to continue until the entire board was of the same moisture content.

The fast drying of the fibers positioned along the borders and the slower drying of the fibers in the center caused distortions of the board. This distortion was more pronounced in board made from slow stock than from free. Such board as it was taken from a dryer was crumpled with waves on the borders and full of bumps. Clip impressions on the borders often caused the board to break so that it could not be used. Even the best machines for calendering could not eliminate this evil in full because it often reappeared in the board when in storage.

A considerable improvement in this method of drying was made by installing fan units within the chamber. These units were located in conjunction with the heating coils so that a more uniform distribution of warm air through the whole dryer chamber could be obtained.

This kind of dryer is still very useful in small mills where the output approximates two tons per twenty-four hours and the grade of board is low. The method of drying is very simple, and the apparatus cheap, but it is necessary to calender the boards after drying.

Such a system of drying, however, in larger mills would result in too high costs for charging and emptying. At the same time the steam consumption of such a dryer approximates four to five pounds per pound of water evaporated.

The deficiencies of the chamber dryer gave rise to the channel dryer in which the board was dried continuously. In such a dryer the board is hung on transporting mediums which travel through the channel. The charging, of course, is done from the head or wet end of the dryer and the dried board discharged from the opposite end.

In reference to methods of hanging the board, it should be mentioned that formerly board was arranged so that its surface was parallel to the length of a dryer. This practice did not give good results as the air following the path of least resistance traveled around the board and touched only the borders. Thus the borders were dried while the centers were still wet.

To overcome this condition a system of cross hanging was introduced. In this system streams of hot air are forced to make their way through the rows of boards from top to bottom. An overlapping of the boards at the points of hanging equalizes the rapidity of drying for both borders and centers.

By using a dryer of this type it is possible to eliminate the doors on the ends of the unit. The boards themselves serve to close the dryer. In addition such a dryer has a capacity 30 to 100 per cent greater, depending on the size of boards, than a dryer of the longitudinal hanging type.

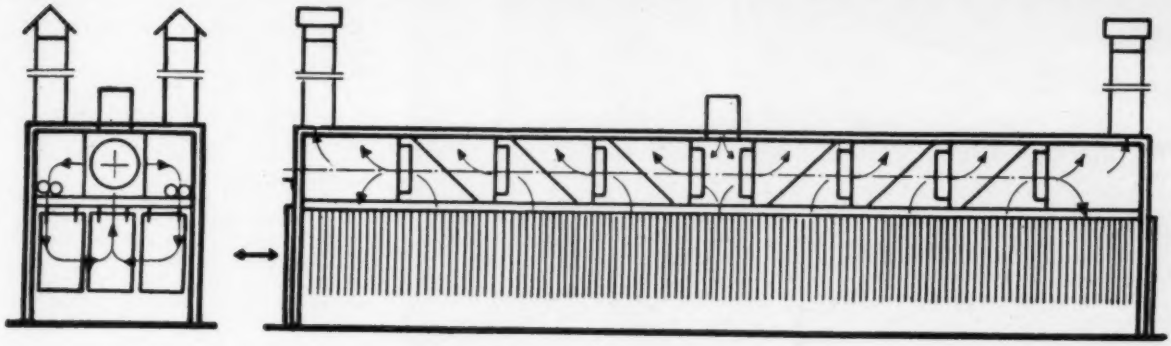
Dryers for the cross hanging of board are built in capacities from two to thirty tons per twenty-four hours. They are built as one way, double, or story channels depending upon the available space, but with the board being transported through each of them in the same manner.

The boards are held by means of clamps equipped with rolls attached to chains which are driven through sprockets and a variable speed drive. In a one-way channel the clamps are arranged in groups that are fastened to supporting beams; while in the double and story dryers the clamps are attached to hanging transport carriages connected with chains. The transporting of the carriages is entirely automatic, the transporting speed being regulated over wide ranges by an interchangeable gear drive.

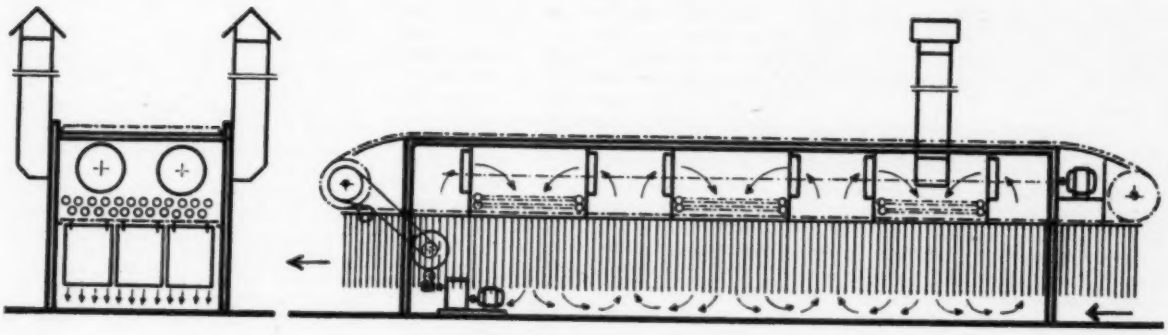
It should be mentioned that it is often necessary, when drying board in a dryer equipped with a hanging system, to reduce the moisture content of the boards to absolute dryness. Then the board is

Hard fiber board dryer with top rollers

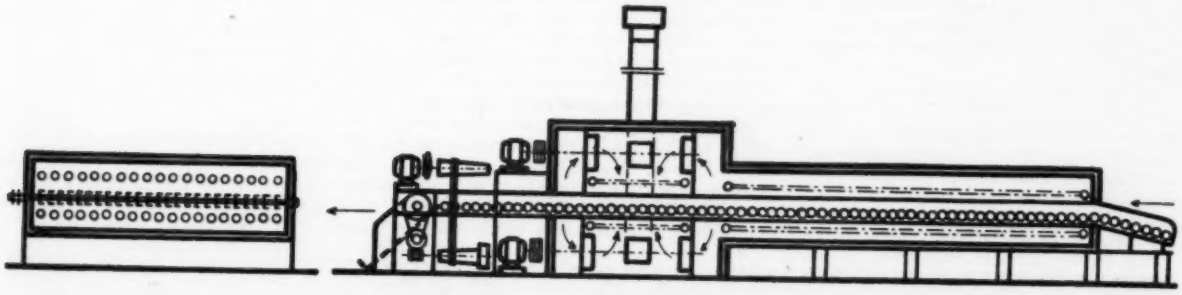
Straight line dryer for 12-ft. sheet 700 ft. long.



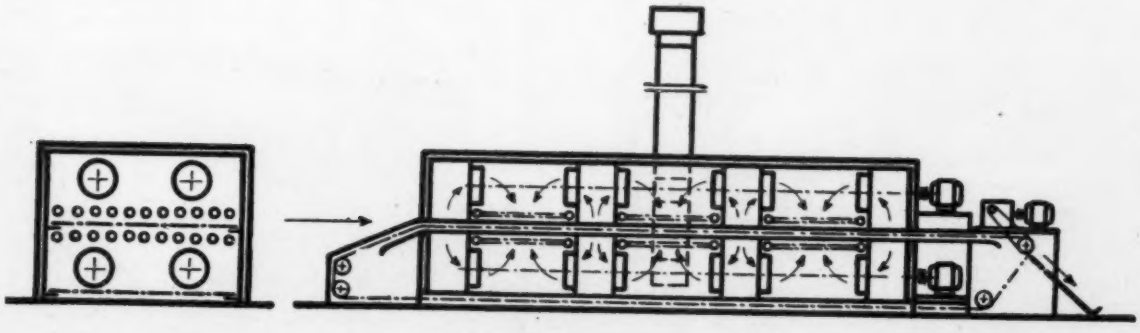
Chamber dryer without transporting element



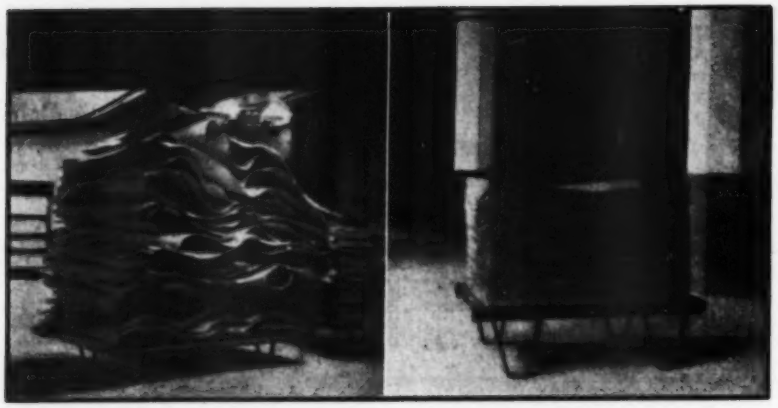
Scheme of a single channel dryer



Scheme of a roller radiation dryer



Section of apron dryer



1.75 mm. board dried in ordinary dryer

1.4 mm. board dried in dryer with proper air circulation

brought to the desired moisture content in a moistening section. Such a section, installed immediately after the dryer, can utilize the exhaust air of the dryer for moistening.

The application of a moistening section is especially necessary when the board must leave a dryer with a uniform moisture content—a condition that is difficult to obtain in ordinary dryers utilizing a hanging system.

Revolutionary improvements in drying technic as well as in heat technic brought about the introduction of the so-called re-circulation system in which board is dried in a flat laying position. In this system the air in the drying channel is brought to a higher degree of saturation than was possible in the older methods by mixing a part of the exhaust air with fresh air, heating the mixture, and then passing the heated mixture into the channel.

By this means it is possible to bring the air that is being exhausted to any desired degree of saturation; or, with higher temperatures, the exhaust may be a mixture of steam and air. Likewise, the motion of the air can be directed, depending upon requirements, either crosswise or longitudinally of the dryer.

Heating coils or registers, built into the course of the circulation streams, insure constant drying temperatures which together with progressive reheating of the air effects a frequent impingement of the boards with air that is exhausted at a very high humidity.

It follows that the amount of exhaust air and with it the loss of heat can be reduced to a minimum without influencing the motion of the air within the drying chamber.

One advantage of this system is its economical use of steam. The steam consumption may be as low as 1.5 pounds per pound of water evaporated.

On account of the multiple reheating of each cubic foot of air supplied to the dryer it is possible to exhaust the air at the wet end at a temperature of 60 deg. C. or more and at a saturation of 70 or 80 per cent or even higher. The exhausted air from such a system carries three to four times more water per cubic foot than air exhausted at 35 deg. from a channel dryer of the earlier type.

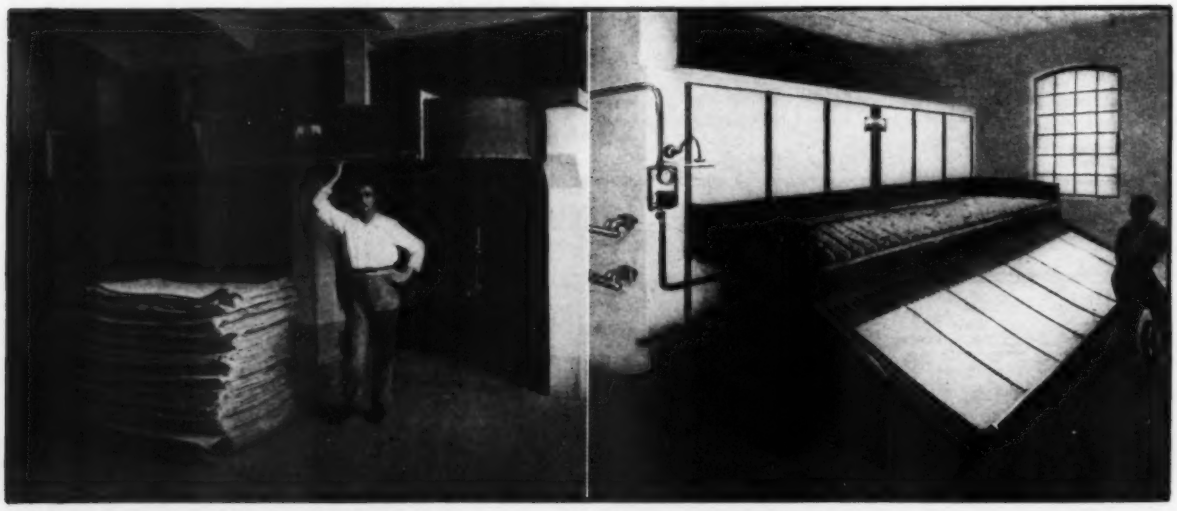
This system also permits temperature control most suitable to the characteristics of the board being dried. The boards entering the dryer are warmed gradually and thoroughly in an atmosphere of relatively high humidity. The presence of this moisture in the air surrounding the boards at this stage of drying retards surface evaporation sufficiently to permit free movement of moisture from within them to the surface. As the boards move through the dryer the temperature is gradually increased and the relative humidity decreased. Such drying procedure eliminates bending, crusting and cracking of the boards.

In addition to the heat economy of such a system there is an improvement in drying technic. An endless band or apron carries the boards in a laying position rather than a hanging position through the dryer. Such a method corresponds to that of lawn drying except that boards in such a dryer are dried with warm high velocity air from both sides rather than one. Fans for air circulation and heating coils arranged above and below the apron insure this condition.

The boards, laid wet on the apron at one end, move slowly through the dryer and come out dried at the other end. The speed of the apron is regulated through a gear box arrangement according to the thickness of the board and the humidity within the channel. It is possible through this regulation to uniformly dry the boards to any desired moisture content, thus making unnecessary the spraying operation after drying.

Not only do flat laying boards result from this system, but also boards that can be used up to the very edges. In many cases it is not even necessary to calender the boards after drying as it was often done only to press out humps, waves or other irregularities and not to obtain a smooth surface.

Another advantage of this type of dryer is the saving in labor over the dryer in which boards must be hung in clamps previous to drying and removed from them after drying. As the boards come out flat from the dryer, they can be more easily stored and at the same time do not require as much storage space. In addition, less broke is produced.



Feed and discharge end of a double channel dryer

Dry end of a roller dryer

A case might be cited in which a board mill reduced its beater furnishes from 10 to 6 or 7 for the same production after installing this type of dryer. This same firm, which previous to the installation of the new dryer produced 30 to 40 per cent of second and third grade 0.3-0.5 mm. boards, had to notify customers after the installation of the new dryer that second and third grade boards could be delivered no longer as they made only first grade.

As has been pointed out, the boards being dried in an apron dryer lay flat on the apron during their entire drying period. In some instances this feature detrimentally affects the quality of the boards.

This situation led to the development of a new design, the roller dryer, in which rollers or revolving discs arranged on shafts take the place of the apron conveyor. As in the case of the apron dryer, this dryer may be operated over a wide range of speed.

Either low or high pressure steam can be utilized for drying the board in a roller dryer. If low pressure steam is utilized, the dryer is arranged with air circulation through the whole channel; whereas if high pressure steam, 5 to 12 atmospheres, is used, an air circulation section is arranged near the dry end of the unit. In the high pressure dryer the temperature gradually increases from the wet end to the dry end.

The roller dryer, like the apron dryer, produces flat laying boards with a minimum of broke; boards which do not require moistening after drying, and boards which pile well in storage.

No mention has been made thus far, except in the case of the chamber dryer, of materials used in the construction of dryer housings. Either brick or steel covered with some insulating material is commonly employed for this purpose.

In conclusion it should be stated that a successful and economical drying installation can only result from the application of a practical drying science to the design. Not only must the designer be familiar with mechanical design in dryer construction but he must also have a knowledge of production experiences with dryers and of the characteristics of the material to be dried.

◆ ◆

◆ Herbert G. Lowe

Herbert G. Lowe, founder and president of the Lowe Paper Co., Ridgefield, New Jersey, and one of the pioneer coated board manufacturers of the country, passed away November 25.

Born March 27, 1859, in Fitchburg, Mass., Mr. Lowe spent over half of his life in that city. In his early manhood he was employed by his father, a meat packer. Later he went into the dye department of the Parkhill Manufacturing Company, a textile mill. Soon after the organization of the Falulah Paper Company, in 1885, Herbert joined his brother, Albert N., and his uncle, Seth L. Lowe, in that company.

This association, which covered the difficult years of development in sales and manufacture, endured until 1905. At that time Mr. Lowe, well-schooled in a practical knowledge of coated boards, left his position as manager of the coating department of Falulah and came to New Jersey, where he organized his own business.

The Lowe Paper Company was incorporated in 1914 with Mr. Lowe as president, his sons Donald V. and Malcolm B. as vice-president and secretary-treasurer, respectively. In 1919, immediately after the return of his sons from war service, the board mills of the E. M. Brown Paper Company, at Rock City Falls, were purchased, and raw stock manufactured at that plant for the coating mill at Ridgefield. In 1924 a modern board mill was erected in Ridgefield adjacent to the Coating Plant, and the operation at Rock City Falls discontinued in 1930. The Ridgefield mills remains today the nearest complete coated paper board mill to New York City.

Ill health compelled Mr. Lowe to give up many of his duties in the business in 1930, and his sons continued in the management of the concern.

Mr. Lowe was a member of the National Paper Trade Association and of the Manufacturers' Association of New Jersey. In addition to his sons, he is survived by his widow, Mary Vaughn Lowe.

◆ Forest Commission Buys Two Million Acres

The National Forest Reservation Commission recently approved for purchase 2,053,169 acres to be added to the National Forests of the eastern half of the United States, Secretary of War George H. Dern, president of the Commission, announced following the meeting. It was by far the largest purchase approval ever made by the commission and involved the projected expenditure of $8,427,663. Today's purchases bring federal forest land purchases in the East for the last 14 months to about 7,000,000 acres. The purchases are being made with part of the $20,000,000 allocated by President Roosevelt from the Emergency Conservation Work funds for this purpose.

Outstanding was the Commission's approval of a deal whereby the Federal Government will acquire the Tionesta tract of virgin forest in western Pennsylvania for addition to the Allegheny National Forest. The tract contains 4,341 acres of virgin hemlock-hardwood forest, practically the last surviving extensive stand of its type in the East. It is to be retained as a Primitive Area for scientific and educational purposes. Limited public use for recreational and inspirational purposes will be permitted.

Many of the lands approved in other forests today carry valuable stands of timber. Some of them were purchased to give assurance to local wood-working industries and to local residents that materials would be made continuously available under sustained-yield management of the timberlands, resulting in employment for local people. Social and economic values extend into all the approvals.

More than 400,000 acres were approved in Texas, nearly 300,000 in the Ozarks region of Missouri, and 588,882 acres in National Forests and purchase units in the Lake States. In the Southern Pine region, 702,611 acres were approved, in the Appalachian region 299,376 acres. Other purchases were in New England, Arkansas, Illinois and Puerto Rico.

The members of the Commission are Secretary of War Dern, Secretary of Interior Ickes, Secretary of Agriculture Wallace, Senator George of Georgia, Senator Keyes of New Hampshire, Congressman Doxey of Mississippi, Congressman Woodruff of Michigan, John E. Burch, Secretary of the Commission.

The name of the Sam Houston National Forest Purchase Unit in Texas was changed to the San Jacinto Unit. This change was made to clear the way for combining all four purchase units in Texas, the Sabine, Davy Crockett, Angelina, and the newly-named San Jacinto into the large Sam Houston National Forest. The units will remain administrative divisions bearing these designations.

◆ Gair "Old Timers" Hold Second Gathering

Past and former members of the Robert Gair Company, Inc. organization held the second annual dinner of the "Gair Old Timers" at the Hotel New Yorker recently. The event brought together more than 165 men who are now in the organization or who have served for varying periods in the past, including some who began with the company as far back as the 1870s. In addition to those who came from all sections of the East and Middle-West to attend the dinner, there were messages from as far off as San Francisco from those who were unable to be present.

The function was purely social, speeches banned and the only business before the gathering was the election of officers for the ensuing year. Those elected were P. F. Gaffney of the Densen Banner Company, president; A. B. Crowell of the Robert Gair Company, Inc., vice-president, and H. B. Van-Antwerp of Sinclair and Valentine, secretary-treasurer. The retiring officers are Charles F. Stocker of Grinnell Lithographic Company who served as the first president; D. B. Hassinger of Hassinger Art Service who was vice-president, and Francis Smith of the Robert Gair Company, Inc., who was secretary-treasurer.

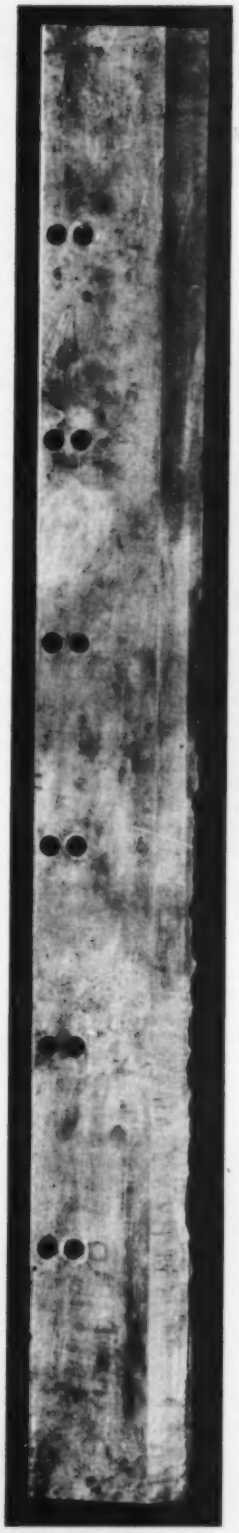
◆ Deputy Administrator Appointed

The National Industrial Recovery Board recently announced the appointment of W. J. Brown of Washington as Deputy Administrator in charge of the paper and pulp section of the Chemical Division.

Mr. Brown organized the Black & White and Yellow Cab companies in Washington, and was president of the companies for thirteen years. For five years he served on the board of directors of the Federal-American National Bank. Since April, 1934, he has been technical adviser to the National Recovery Administration.

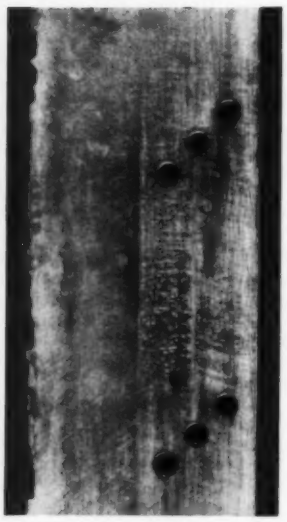
KNIFE GRINDING
Is an Exacting Job

F. R. HENRY
The Simonds Worden White Company



This shows the damaged edge of a paper knife. Perhaps the grinding wheel used was too hard

A paper trimming knife. The edge presents an interesting study



Paper trimming knife showing face side injured in grinding

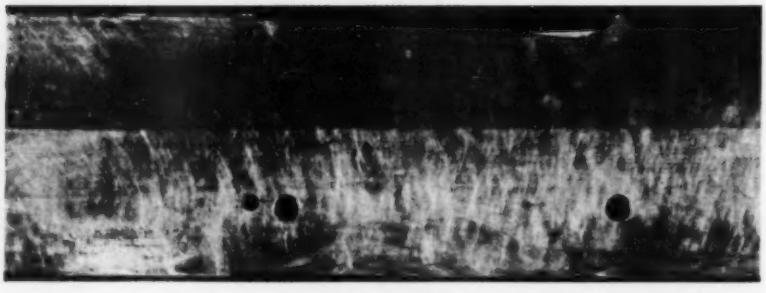
THE grinding of a paper trimming chipper, or any other fine machine knife, requires the greatest care.

If the grinding is properly done, the edge is restored and the knife will cut as well as when it was new. If improperly ground, the knife will not hold a good cutting edge. It may break out; it may have to be returned to the manufacturer for repair; or it may even be damaged irreparably.

Knives may be damaged through grinding in many different ways. The grinding wheel may be too hard; it may not be "dressed" frequently enough; there may not be a sufficient supply of coolant applied at the point of contact or too deep a cut may be attempted.

In selecting a wheel, soft to medium grades are preferable to hard grades. It is true that the softer wheels wear away faster; however, a wheel which wears away rapidly is a wheel which is usually one which grinds easily with a minimum of heat generated. Even though the proper grade of wheel is used it

Damaged paper trimming knife showing the face side



Same knife as above, from the bevel side

A close-up view of section of paper knife with cracks and fissures plainly visible

is necessary to keep it clean by using a wheel dresser. It is more economical to waste a little of the wheel by dressing it off than it is to use it when its grinding face is loaded with steel, thus preventing its cutting freely.

An abundance of water or other coolant directed at the point of contact between the knife and the wheel is also important. This prevents the knife from becoming overheated or checked during the grinding operation.

Since the generating of excessive heat is to be avoided as much as possible, it naturally follows that too much metal should not be removed with each pass of the wheel.

Machine knife cutting edges are made of highly refined and processed steels of qualities comparable to your grandfather's razor and are entitled to the same care.

The accompanying illustrations indicate some common causes of knife failures. These knives have been overheated or what is termed "checked" in grinding. The "checking" on these knives was first noted by a fine hair line or crack, usually running at right angles to the cutting edge.

The grinding of a machine knife is a highly specialized task and therefore should always be entrusted to a properly trained and skilled workman.

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◆ M. HOWARD MORLEY who has been associated with the International Paper Company for some 18 years and for the last six years Manager of the Book and Bond Division, has tendered his resignation, effective January 1, 1935. Mr. Morley is joining the Thames Board Mills of Purfleet, Essex, England, which plans to build a new mill.

◆ T.A.P.P.I. Annual Meeting Plans

At the meeting of the Planning Committee of the Technical Association of the Pulp and Paper Industry held last week, plans for the Annual Meeting of the Association to be held at the Waldorf-Astoria, New York City, February 18 to 21, 1935, were drawn up.

The convention will be a four-day affair opening with a joint meeting on Monday, February 18, with the American Paper and Pulp Association, when "Management and Labor Relations" will be discussed by outstanding authorities and closing with the annual luncheon, the major event of Paper Week.

It is doubtful if better arrangements have ever been made for an annual meeting than for this coming one. Papers and authors are being carefully selected and instead of presenting a heterogeneous group of papers, a number of well defined symposia is being projected.

On Tuesday, February 19, there will be a symposium on paper manufacture which will feature papers on head box design, fourdrinier wires and drier drainage. There will be a symposia on sizing, water and bleaching and one on steam power plants.

On Wednesday, February 20, a much needed symposium on paper color and optical properties of paper will be the major feature. There will also be a symposium on mechanical pulp or groundwood, and one on pulp and paper testing.

On Thursday, February 21, there will be a symposium on stuff preparation which will cover such subjects as beating, refining, and measurement of hydration.

One feature of the annual luncheon will be the presentation of the T.A.P.P.I. Medal which is presented for outstanding contributions to the technical advancement of the industry. The principal speaker will be an individual who is well qualified to present the subject of greatest importance to the industry at the time of the meeting. As usual great care will be taken in selecting such a speaker.

◆ Annual Meeting National Paperboard Ass'n

The annual meeting of the National Paperboard Association, Inc., was held at the Waldorf-Astoria Hotel, New York City, November 15.

Expressions by members of the Paperboard Industry representing both large and small mills were for the most part quite optimistic as to the outlook for the future, the general sentiment being much better than it was a year ago.

President Sidney Frohman addressed the meeting on "Association Activities of the Past Year," bringing out a number of very interesting points. Concluding his report, he said:

"In the belief that the quality of paper-stock should be improved, and in an effort to secure a continuous, dependable supply, a program was put into effect in the West in the summer of 1933, whereby a committee representing our industry meets regularly with a similar committee appointed by the Waste Paper Association. These conferences have been continued and from all reports the quality of paper-stock has shown a marked improvement.

"In comparison with other industries, I feel that we have made substantial progress during the past year and that our industry, as a whole, has made a showing of which every member may be proud. Let us remember that ours is a growing industry in which we have our investment. Let us further remember that our individual activities affect the entire industry. We too have it in our power to make our industry a credit to the nation. Is it not *our* duty to keep our industry out of red ink, and to make it sufficiently profitable to enable us to pay fair wages to our employes, provide a return to the Government in the form of taxes on profit, and make it possible for us to present to our stockholders at the end of each year a statement which shows intelligent management rather than an excuse as to why we, as executives, have failed to make a profit for our stockholders?

"As a last word, I feel that the Paperboard Industry as a whole is now in an excellent position to take full advantage of any improvement in general business conditions, which improvement I confidently anticipate from now on. Let each of us do his full share in bringing about that improvement."

◆ H. F. HACKEDORN, JR., who, during the past fifteen years, has been active in the sale of building products, to the steel industry, has been appointed vice-president and sales manager of the Lubrication Products Company, Burgettstown, Pa., an outgrowth of the reorganization of the company formerly known as the Journal Lubricator Company. The new company has taken over the patent rights for the positive journal lubricator known as Stapax. General offices are located at 1531 West Twenty-fifth Street, Cleveland, Ohio.

◆ A. S. M. E. Printing Industries Division

The Printing Industries Division of the American Society of Mechanical Engineers has announced the following elections:

George D. Bearce, consulting engineer in the paper and printing industries, 501 Fifth Avenue, New York, and formerly manager of the Dalhousie Mill of the International Paper Company, was selected as chairman of the program committee of the Division.

William R. Maull, vice-president of Dill & Collins, Inc., Philadelphia, was reappointed chairman of the pulp and paper committee.

R. G. Macdonald, secretary-treasurer of the Technical Association of the Pulp and Paper Industry, was elected member of the executive committee for three years.

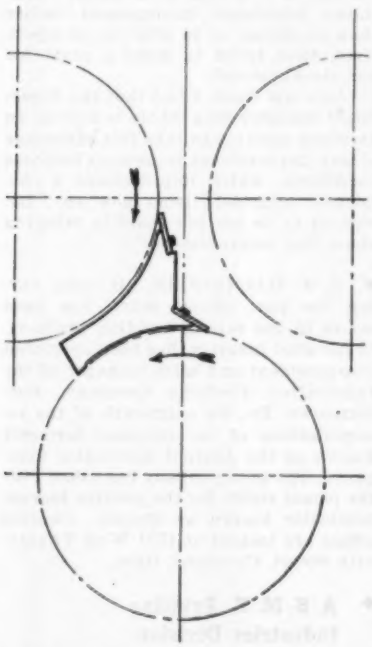
Edward Epstein, well known photo-engraver, and E. P. Hulse, consultant, both of New York City, were elected respectively chairman and secretary of the Division.

◆ Dalton Dryer Scraper

A very simple device, known as the Dalton dryer scraper, has been developed and is now on the market for removing incrustations on paper machine dryers.

Each scraper is a tailor-made job depending upon the arrangement of the dryers of the individual machine. The body of the scraper is of cast iron and is 8 inches wide. It is shaped to hold two carbon steel blades in such a manner that the scraper, when placed into position, causes these blades to scrape the surfaces of two adjacent dryers at the same time. Of course, the two dryers must be revolving in opposite directions.

It is only necessary, when using the scraper, to move it slowly across the dryers from the front to the back and back to the front again.



This device is suggested for use when a machine is down for a wash-up. It is claimed that 10 or 12 ordinary dryers can be cleaned with the scraper during such a period.

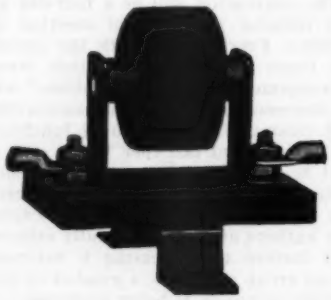
Complete information on the Dalton dryer scraper may be obtained from Clyde H. Mitchell, 7255 Yates Avenue, Chicago, who is acting as exclusive sales representative for it.

◆ Hypochlorite Feeder

The application of H-O-H proportioning principles, according to an announcement by D. W. Haering & Co., Inc., 3408 Monroe Street, Chicago, Ill., has been made by them in the development of a feeder designed primarily for feeding hypochlorite solutions. The unit, which is stated to be absolutely proportionate, is simple in construction, and is protected against the corrosive action of chlorine through the use of hard rubber connections and rubber lined tanks.

◆ Discharge Resistor

To protect the insulation of d-c. magnetic circuits against excessive discharge voltages when the circuits are opened, a new type of discharge resistor acting on the same principle as the Thyrite lightning arrester, has been introduced by the General Electric Company, Schenectady, N. Y.



The new unit is available in two ratings: One for 110 to 275 volts; the other for 500 to 650 volts; and can be conveniently applied to protect d-c. motor fields, lifting magnets, shunt fields of a-c. and d-c. generators, etc.

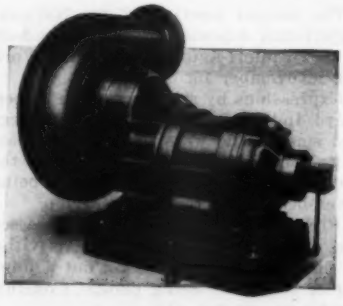
◆ A Glossmeter

An instrument which is said to be well adapted to measuring the gloss of coated and high finish papers has been developed at the Henry A. Gardner Laboratory, 2201 New York Avenue, N. W., Washington, D. C. The instrument is small, portable and self-contained. It operates from a flashlight battery.

The Glossmeter measures the intensity of specular (mirror) reflection from the surface to which it is applied. Gloss readings are obtained alike on black, colored and transparent, as well as white papers.

◆ Geared-Head Turbo-Blower

A turbo-blower, making use of a gearmotor, has been introduced by Allis-Chalmers Mfg. Co., Milwaukee, Wis. The use of the gearmotor, according to the manufacturer, makes it possible to run the blower at higher than motor speeds, thus reducing dimensions and improving performance. Among the suggested applications for the blower, the volumetric capacities of which correspond to motor outputs from 3 to 30 hp., are pneumatic conveying, agitation and aeration and for similar moderately low pressure air service.

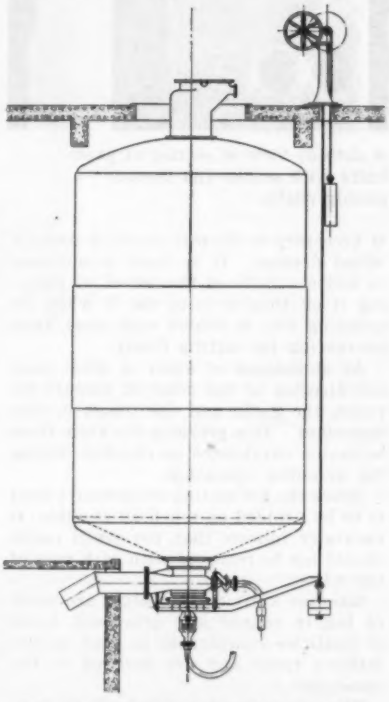


◆ System for Emptying Diffusers

Fibre Making Processes, Inc., Willoughby Tower, Chicago, according to a recent announcement, has acquired complete manufacturing and sales rights in the United States and Canada to the Sandberg system for emptying diffusers.

This system includes a valve arrangement which enables a diffuser to be emptied by simply operating a valve control. The Sandberg valve, installed in the bottom of a diffuser equipped with conical strainer, is opened by means of a handwheel located on the operating floor.

Emptying proceeds automatically upon opening the valve and turning on a stream of high-pressure water. The water is introduced into the Sandberg valve through two apertures located beneath the valve disc, thus preventing the passage of any of the water into the diffuser and the dilution of black liquor when the valve is closed.



The valve stem is supported on a bearing and is actuated by a pair of levers connected to the operating gear on the operating floor. There is a sprocket on the valve cover which rotates the valve stem and disc slowly while the valve is open. There is no movement while the valve is closed. This sprocket, driven by a chain from a central driving unit which serves a group of diffusers, contains a number of holes which, when the valve is opened, engage corresponding projecting pins on a coupling mounted on the valve stem and thus cause the rotation of valve stem and disc.

When the diffuser is empty, the operator turns off the water and closes the emptying valve. The complete emptying operation is done from the operating floor as there is no cover to replace or other operation which requires the attention of the operator.

◆ Grease Packed In Cartridges

Greases packed in cartridge form to fit a new type of grease gun are now being sold by the Standard Oil Company (Indiana).

The cartridges now being made are of one-pound capacity and include several grades of lubricant. Each cartridge has a sliding bottom which acts as a plunger to feed the lubricant into the high pressure chamber in the nose of the gun. A partially used cartridge can be quickly replaced with another cartridge of different grade of lubricant, and the lubricant in the used cartridge, being enclosed, is not wasted and does not accumulate dirt.

This lubrication system has been perfected during the past few years by the Lubrication Corporation, Chicago, a concern owned jointly by the Standard Oil Company of Indiana and Bendix Aviation Corporation.

◆ All-Purpose Industrial Tractor

A new all-purpose industrial tractor, built in three models to meet the demands of various types of service ranging from general industrial use to the "spotting" or shifting of freight cars on

plant sidings, has been announced by the Clark Tructractor Company, Battle Creek, Michigan.

Each model is equipped with self-starter, generator, battery, electric horn, front bumper plate, eye coupler and pneumatic tires. Lights are also available. Included in the extra equipment available are dual pneumatic or solid tires, special couplers, Clark condensing muffler, speedometer and front fenders.

◆ New Hand Trucks

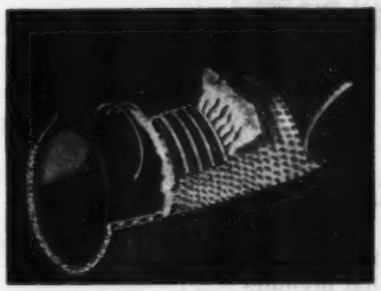
The Fairbanks Company, New York, is placing on the market a new line of hand trucks in which wooden frames are reinforced both front and back with steel straps extending the full length of the handles; and the cross bars are of channel-shaped pressed steel. The nose irons are placed over the handle straps, while continuous type wheel guards are integral with the lowest cross bar. Oversize axles of high-carbon steel also add materially to the strength of the trucks.

Leg irons are of convex shape and are well braced. The wheels are slightly crown-faced, a feature which is said to make the wheels less liable to chip than if they were flat.

These trucks can likewise be equipped with rubber tired wheels, roller bearings and Zerk lubrication if desired.

◆ New Type of Suction Hose

The Electric Hose and Rubber Company, Wilmington, Delaware, has developed a new type of construction for suction hose. A woven tubular re-enforcement of strong cabled cotton cords and wire are utilized to produce a strong, light hose which will not collapse. It also has a smooth lining of specially compounded rubber which is said to offer minimum frictional resistance to flow and to have long life.

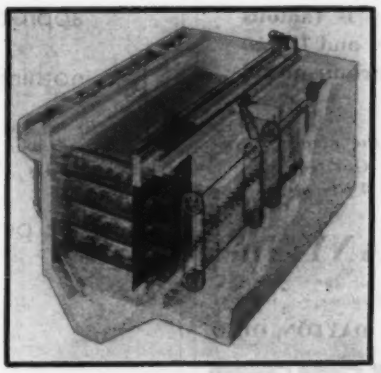


This new hose, known as Delmar suction hose, is made in all sizes up to 4-inch inside diameter and can be used in practically all types of suction hose service.

◆ Sedimentation Concentrator

The latest addition to the line of water purification equipment manufactured by the International Filter Company, Chicago, is designated as the Super-Settler.

Concrete tanks with interior construction of either precast concrete, steel or Transite is usual construction; but the structure allows the use of any suitable material whether located above or below ground level. The sludge collecting and moving mechanism is extremely simple, and is positive in operation. This mechanism may even be lifted out and later put back into the tank without stopping the flow through the apparatus.



Flow control of both sludge and liquid, shallow settling depths, rapid evacuation of material after separation, velocity of flow and short circuiting, each under positive control, are among the features cited for the equipment.

Complete details are contained in a bulletin issued by the manufacturer and which will be mailed by them upon request.

◆ Bronze Regrind-Renew Valves

A line of extra heavy bronze regrind-renew valves which are made in globe and angle patterns has been announced by Jenkins Bros.

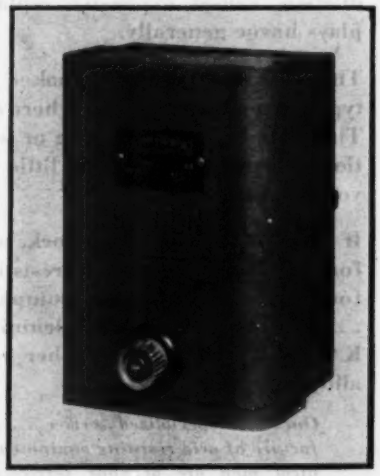
These valves are of the union bonnet type in sizes up to 2". The 2½" and 3" sizes are made with bolted bonnet. Screwed end valves are recommended for 300 lb. steam pressure and 500 lb. oil, water, or gas pressure. Flanged end valves are for pressures of 250 lb. steam, or 400 lb on oil, water, or gas.

Stuffing boxes are deep and contain a liberal bulk of lubricated and graphited asbestos packing. The use of a bronze gland or follower for compressing the packing permits tightness with but slight effort applied to the packing nut. Furthermore, the valves are so designed that, when fully open, the fluid passing through them cannot contact the operating threads of the spindles.

Data on these new regrind-renew valves and other recent additions to the Jenkins line will be furnished by Jenkins Bros., 80 White Street, New York.

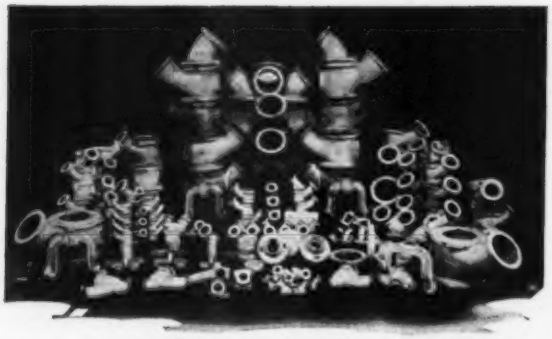
◆ Motor Starter Prevents Accidental Starting

The Lincoln Electric Company, Cleveland, Ohio, has announced a new line of automatic starters designed to prevent accidental starting and to permit taking full advantage of a motor's capacity without danger of burning it out.



The new starters are furnished in three types for different horsepowers and 110, 220, 440 and 550 volts: The types are designated as XLA, XLB, and XLBB. The XLA starter is for 3 and 5 hp. motors—110 volts, and also for 3, 5, 7½ and 10 hp.—220, 440, and 550 volts; while the XLB starter is for 7½ and 10 hp.—110 volts, 15, 20, 25 and 30 hp.—220 volts, 15, 20 and 25 hp.—440 volts, and 15 and 20 hp.—550 volts; and the XLBB for 30 hp.—440 volts, and 25 and 30 hp.— 550 volts.

Wiring of more than one control station is permitted by the arrangement of the starter case. Overload can be reset on the outside of the case, thus permitting the case to be locked to prevent tampering with the switch mechanism.



Group of miscellaneous castings for alloy steel valves

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Of course valves are only a small part of your plant equipment . . . but a valve that becomes corroded, or clogged, or wears out takes on new significance.

When the motor car breaks down we realize how much we have depended upon it.

The same is true of valves. Valve failure is irritating as well as expensive. It slows up production, causes expensive replacements, and plays havoc generally.

The Duriron Company makes valves of all types for every type of job where acids are used. They stand up under strong or weak acid solutions, hot or cold, with so little attention that you just forget about them.

If what you want isn't in stock, we can make it for you . . . from corrosion resisting alloy steels for which The Duriron Company is famous . . . Durimet, Durichlor, Alcumite, and Durco KA2S, KA2SMo and other chrome-nickel alloys.

Ours is a specialized service . . . the manufacture of acid resisting equipment. Our technical men are at your service. Write us.

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PIPE FITTINGS **ACID PUMPS**
DIGESTER STRAINERS

A PENNY FOR SOME FOLKS' THOUGHTS IS A PENNY TOO MUCH

—Uncle Jake

This is particularly true for those in the paper industry who go around piously telling everybody else "it pays to advertise," but whose personal policy is to let George do it.

What are we thinking about!

Here we are, the one industry that stands to profit most by any increase in advertising appropriations—doing almost nothing about it.

Truly, "where there is no vision, the people perish."

KVP

KALAMAZOO VEGETABLE PARCHMENT COMPANY
PARCHMENT (Kalamazoo County) MICHIGAN

◆ William W. Campbell

William W. Campbell, president of the Lockport Felt Company, Lockport, N. Y., passed away at his home in Lockport November 21, at the age of 64 years.

Mr. Campbell had for many years been prominently identified with many of the leading civic and commercial enterprises in Lockport and western New York. He probably attained his greatest public prominence as state senator, serving twelve years in the Legislature as a representative of the 47th senatorial district.

Mr. Campbell is survived by his widow and three children.

◆ Acquisitions by Link-Belt

Announcement is made by Link-Belt Company, of Chicago, of the purchase of the physical assets of the Bailey-Burruss Manufacturing Company, Atlanta, Georgia. All divisions of Link-Belt's Atlanta sales office, heretofore located in the Haas-Howell Building, are being moved to the Bailey-Burruss plant, which will henceforth be known as the Atlanta Plant of Link-Belt Company.

The new combined operations will be headed by I. H. Barbee, a Link-Belt engineer of long experience, who is being transferred from the Philadelphia plant of the company. Mr. Barbee was formerly the manager of Link-Belt Company's office in Atlanta. R. L. Lowder and J. R. Martin of the Link-Belt Atlanta office will continue as a part of the new Atlanta organization, as will J. O. Bailey of the Bailey-Burruss Manufacturing Company.

Mr. Barbee says that with this personnel, the acquisition of all Bailey-Burruss machinery equipment, and the added stocks of Link-Belt conveying and power transmitting machinery which will be carried on hand, the reorganized Atlanta organization should be in position to serve the trade to much better advantage than heretofore.

Announcement also is made that the Modern Coal Burner Co., a subsidiary of Peabody Coal Company, has relinquished its automatic stoker business; and that Link-Belt Company, Chicago, has acquired manufacturing and sales rights to the modern coal burner.

Max H. Hurd, vice president, Link-Belt Company, states that the Modern Coal Burner Company's stokers will be added to the Link-Belt line of stokers; that stocks of parts have already been taken over by the Link-Belt Stoker Division, the company's Caldwell-Moore plant at 2410 West 18th St., Chicago; that there is to be no interruption or impairment of service to owners and operators of Modern burners; and that Modern's present dealers have been asked to continue to handle the line.

Link-Belt Company and Modern Coal Burner Company, both, have been building automatic stoker equipment for about five years, in sizes ranging from household size to 250 B.h.p.

◆ IN THE RECENT fall election, William H. Lee, of the Lockport Felt Company, Lockport, New York, was re-elected State Senator.

◆ New Catalogues and Publications

C. O. Bartlett & Snow Co., Cleveland, O.—A new bulletin is devoted to this company's line of boiler equipment. The bulletin takes up first a description and the development of Bartlett-Snow Centralized Coal and Ash Handling System; the advantages it offers are explained briefly; and a table is provided to assist engineers in determining the sizes and capacities of equipment required for various sizes of plants based on the rated horsepower of the plant. Typical plant layouts are suggested and diagrammed. The bulletin is really a handbook and contains unusual and informative data. There are 102 illustrations, 11 tables and 44 diagrams.

Bausch & Lomb Optical Co., Rochester, N. Y.—Two new publications have recently been received from this company. One is entitled "Something New in Spectrographs," in which is given a detailed description of the Small Littrow Spectrograph with specifications and prices of the instrument and its accessories. The other bulletin is devoted to a description of The Density Comparator, an instrument designed for accurate and rapid quantitative spectrographic analysis.

J. H. Day Company, Cincinnati, Ohio—The Day Ro-Ball Stabilized Gyrating Screen is the subject of a new bulletin just issued. A two-page diagrammatic illustration is used to point out and describe the distinctive features of this screen. Specifications are included and reasons are set forth as to why better results are obtained on these screens. The bulletin is known as No. 362.

Linde Air Products Co., New York City—A new and completely revised edition of the pamphlet "Precautions and Safe Practices" which has been in industrial safety work, has just been issued by this company. The advances in the oxy-acetylene process and its widening use during recent years have shown where additional emphasis in safety precautions is needed and have necessitated some new suggestions. Another valuable addition to oxy-acetylene literature is "Recommended Practices for Gas Cutting of Structural Steel," also just announced by this company. It is claimed this is the first complete and authoritative treatment of this subject and for the first time sets up qualification tests for the predetermination of good workmanship from the standpoint of dimensional accuracy and smoothness of cuts. Copies of both booklets will be sent upon request.

Oliver United Filters, Inc., Balfour Bldg., San Francisco—A new 32-page multicolored catalogue presenting complete information on saveralls, deckers, high-density thickeners, bleach washers, high-flow and lime mud filters, brown stock washers, board machines and other heavy mill equipment, is ready for distribution. Each unit is individually described and accompanied by technical details. Interesting illustrations show the products installed in various large paper mills throughout America. Blue prints and flow diagrams are utilized to illustrate the actual operation of the products in relation to companion equipment. Copies on request.

Roots-Connersville Blower Corp., Connersville, Ind.—Bulletin 22:23-B10 illustrates and describes the company's line of standard and heavy duty types of blowers. The characteristics and operating principle of the rotary positive type of blower is discussed with a cross-sectional view and performance curve. Typical installations are illustrated and there are sectionalized views of the heavy duty and standard types of blowers.

Worthington Pump & Mach'y Co., Harrison, New Jersey—Two new bulletins just received from this company are: "Worthington Centrifugal Pumps, Two-Stage Volute," in which is shown a diagrammatic cross-section view listing all parts of this pump together with a brief description. The other, "Worthington Centrifugal Pumps, Single-Stage Volute," also shows all parts diagrammatically and contains a graph illustrating the application of a number of pumps to a system with variable present requirements and a future requirement.

BOOKS

Handbook of Chemistry is the title of a new reference work that has been compiled and edited by Norbert Adolp Lange, Ph. D. It is a most comprehensive work and in preparing it Dr. Lange was assisted by Gordon M. Forker, B. S. (Chem. Engr.) as well as by an extensive list of collaborators of whom seventy are listed in the acknowledgment. The book is 5¼ x 7¾ inches, and contains over 1500 pages of chemical tables, formulas, and other data. Data are given for all of the elements. Then there is an extensive tabulation of material covering properties of minerals; physical constants of inorganic and organic compounds, alkaloids, and glucosides, as well as constants of fats, oils, and waxes; physical and chemical properties of resins; and trade names and formulas of dyestuff intermediates. Other pages include data on chemicals required for treatment of different genera of algae, composition of various woods, constants for certain gases and vapors, corrosion and heat-resistant alloys, electrometric determination of hydrogen ion concentration, organic reagents for inorganic analysis, laboratory solutions, equations and equivalents for volumetric analysis, gravimetric factors and their logarithms, properties of saturated steam, barometry and barometric corrections, definitions of chemical terms, table of conversion factors, and an appendix of 248 pages of mathematical formulas and theorems by Dr. Richard Stevens Burington in addition to a multiplicity of other tabulated data. The index alone covers 29 pages upon which over 2500 listings are made.

This book should prove a valuable reference work for any one requiring access to chemical and physical data whether in the laboratory or the plant. It is printed attractively on a good grade of paper, is bound in Fabricoid, and is priced at $6.00 per copy. The publishers are Handbook Publishers, Inc., Sandusky, Ohio.

Lockwood's Directory of the Paper and Allied Trades—The sixteenth annual edition of this directory has just been received. Due to operating conditions among the mills many changes in listings and personnel have necessarily been made. The changing conditions have made necessary a large number of revisions in all sections of the directory, and the Equipment Index has been expanded. A number of new entries have been made in the section devoted to trade associations and this will be particularly helpful because of the important part taken by associations under the NRA. On account of changes that are constantly taking place, no code information has been included in the directory, but such information can always be obtained through the various associations. The Directory is published annually by the Lockwood Trade Journal Co., Inc., New York City, and is available in two editions, the regular edition containing more than 1,000 pages and the Travelers' edition of about 250 pages, including only the pulp and paper mill section. The cost of each edition is $7.50 or $7.00 cash with order.

Post's Paper Mill Directory—The 1934-35 edition of this publication, which is put out by L. D. Post, Inc., New York City, has just been released. The mill section, as well as the buyer's guide and classified lists of converters and paper merchants have been revised and brought up to date. This issue contains 572 pages. An interesting and practical feature of this directory is that maps of the various states are placed throughout the mill section. These maps indicate the location of paper, pulp, or paper and pulp mills located within the state. The book is priced at $4.00.

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14025 Aspinwall Avenue Cleveland, Ohio

For The Papermaker's Library

Papermaking Research Around the World, by Dr. Louis E. Wise.

Identification and Microscopy of Woods and Wood Fibers Used in the Manufacture of Pulp, by Ellwood S. Harrar and J. Elton Lodewick.

Lessons in Paper Making, Part 1, by Harry Williamson.

Lessons in Paper Making, Part 2, by Harry Williamson.

Practical Helps for the Mill Man.

Each one of these publications contains a wealth of information, and they are priced at only fifty cents per copy prepaid.

THE PAPER INDUSTRY
333 North Michigan Avenue Chicago, Illinois

◆ Ohio T.A.P.P.I. at Middletown

Preparatory to the formation of a Section of the Technical Association of the Pulp and Paper Industry in Southern Ohio about sixty members and friends of the association met at the Manchester Hotel, Middletown, Ohio, November 20. H. H. Latimer, general superintendent of the Beckett Paper Company, Hamilton, Ohio, presided as temporary chairman.

Following an excellent dinner, the chairman appointed a special committee consisting of L. C. Currier of the Sorg Paper Company, Middletown; Vincent F. Waters of the Wrenn Paper Company, Middletown; and George F. Hermann of the Hermann Manufacturing Company, Lancaster, Ohio, to nominate an Organization Committee to serve as the provisional executive body until the next meeting when officers will be elected.

Appoint Special Organization Committee

The members of the committee which was proposed and elected were as follows: Joseph H. Wallace, Black-Clawson Company, Hamilton, chairman; George H. Harvey, Gardner-Richardson Company, Middletown; E. C. Hendrickson, Mead Corporation, Chillicothe; O. P. Gephart, Oxford Miami Paper Company, W. Carrollton; R. B. Roe, Sorg Paper Company; C. D. Roess, Wrenn Paper Company; and J. F. Ohlson, Oxford Miami Paper Company.

George H. Harvey, production manager of the Gardner-Richardson Company and one of the first members of T.A.P.P.I. in the Miami Valley was called upon to speak, and, in a few well chosen words, he welcomed the organization of a T.A.P.P.I. Section, pointing out that nearly all of the important improvements that have been made in pulp and paper manufacture in the past twenty-five years have been due to the efforts of technical men, most of whom are members of the Technical Association.

R. G. Macdonald, national secretary-treasurer of T.A.P.P.I., was the next speaker. Mr. Macdonald pointed out that he was "pinch-hitting" for Clark Heritage, president of the Association, who is in Europe and had planned to be present. He stated that a new section in the Miami Valley will be the sixth, there being sections located in the Pacific Northwest, Lake States, Kalamazoo Valley, New England and in the Delaware Valley.

The secretary proceeded to outline the various activities of the association—its divisions, publications, manual of standards, and services to members. The plans for the annual meeting in New York on February 18 to 21, 1935, were described.

Speed Control Devices and Wires Discussed

D. E. Lewellen, president of the Lewellen Manufacturing Company, Columbus, Indiana, described the various speed control devices made by his company. These included the Harvey-Lewellen drive for board mills; the Lewellen jordan control by means of a uniform load on a motor directly connected to a jordan; the cylinder vat control whereby the liquid levels inside and outside the cylinders is kept constant; and automatic screen flushing controls. Mr. Lewellen emphasized that these controls are not intended to replace men but to serve as a tool with which they may do better work.

H. G. Specht, vice-president of the Eastwood-Nealley Corporation, Belleville, N. J., discussed "The Manufacture and Use of Fourdrinier Wires." This talk was excellently illustrated with slides. Mr. Specht pointed out that there are 1,000 paper machines in the United States, on which every wire was custom-built. Among these machines is a wide divergence of lengths and widths of wires and the duties to be performed by them.

The various wire seams were shown and a large number of accident effects were illustrated. The best ways of repairing wires were described. Mr. Specht advocated that the Technical Association establish a standard means of expressing wire life in foot-days to avoid the term "days run." There is also a need for a method of measuring the running tension of wires.

The causes for short wire life were indicated. These related to the load on the wire apron, the method of oscillating suction boxes, the design of suction box covers, angle of wire with the stretch roll, location of showers and doctor blades, etc.

No bragging intended; but it's a fact that we've built up a sizeable mail-order-business with ARMCO SPIRAL WELDED PIPE. It is convenient for our 57 paper mill customers; for they know that whether they order 10 lengths or a hundred, they will get the same good money-saving pipe . . . Pipe that's quickly obtained, easily installed; pipe that stands up under wear, tear and corrosion. ARMCO PIPE is made straight, true-round and smooth inside. It's manufactured from INGOT IRON for rust-resistance and spiral welded for great strength. Maybe you would like to order it by mail, too. Just tell us your needs—the use, sizes, and number of lengths. You'll get ACTION!

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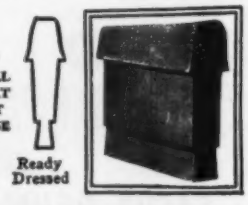

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The Paper Industry Safety Contest

July 1, 1934 to June 30, 1935

Scores as of October 31, 1934 (Cum.)

24 Mills Keep Perfect Record

PERFECT SCORES

Division I—Paper and Pulp Mills

	PARTICIPANT	MILL	LOCATION
GROUP A			
GROUP B	St. Croix Paper Co.	Woodland	Maine
GROUP C	Escanaba Paper Co.	Escanaba	Michigan
	Oxford Miami Paper Co.	West Carrollton	Ohio
	Crystal Tissue Co.	Middletown	Ohio
GROUP D	Sylva Paperboard Co.	Sylva	North Carolina
	Kimberly-Clark Corp.	Lakeview	Neenah, Wis.
	Bergstrom Paper Co.	Neenah	Wisconsin
	International Paper Co.	Webster	Orono, Maine
	Hollingsworth & Whitney Co.	Arrostook & Cobassee	Gardiner, Maine
	Bird & Son, Inc.	Phillipsdale	Rhode Island
	U. S. Envelope Co.	Worcester	Massachusetts
	International Paper Co.	Livermore	Chisholm, Maine
	Spaulding Fibre Co., Inc.	New Mill	Milton, N. H.
	U. S. Gypsum Co.	Gypsum	Ohio
	International Paper Co.	Riley	Maine
	U. S. Gypsum Co.	Genoa	Ohio
	Spaulding Fibre Co.	North Rochester	New Hampshire
	Mead Paperboard Co.	Rockport	Indiana

Division II—Remanufacturing

Container Corp. of America	35th Street	Chicago
International Paper Co.	Continental Div.	Elizabeth, N. J.
Texas Corrugated Box Co.	Dallas	Texas
Container Corp. of America	Natick	Massachusetts
Southern Container Co.	Houston	Texas
Bemis Brothers Bag Co.	East Pepperell	Massachusetts

IMPERFECT SCORES

	Key No.	Rank	Disabling Injuries	Frequency Rate
GROUP A	P-19	1	1	2.194
	P-108	2	2	2.819
	P-27	3	6	6.316
	P-30	4	3	6.379
	P-13	5	4	6.703
	P-18	6	6	7.551
	P-64	7	4	8.751
	P-12	8	4	9.308
	P-10	9	4	9.447
	P-62	10	6	9.557
	P-67	11	8	11.563
	P-95	12	6	13.433
	P-44	13	7	13.637
	P-114	14	10	14.378
	P-28	15	13	16.049
	P-31	16	10	17.194
	P-1	17	13	18.626
	P-87	18	12	20.574
	P-2	19	7	21.037
	P-69	20	11	21.355
	P-102	21	20	28.833
	P-101	22	14	32.314
	P-78	23	15	33.147
	P-74	24	26	53.907
	P-71	25	31	69.636
GROUP B	P-23	2	2	5.147
	P-68	3	2	6.510
	P-11	4	2	7.116
	P-56	5	2	8.009
	P-21	6	3	8.215
	P-40	7	3	8.482
	P-70	8	3	9.860
	P-22	9	3	10.958
	P-60	10	4	12.996
	P-45	11	6	15.850
	P-113	12	5	16.158
	P-76	13	6	21.658
	P-26	14	7	23.520
	P-46	15	6	24.792
	P-32	16	9	27.251
	P-73	17	10	28.054
	P-16	18	8	28.148
	P-82	19	11	32.439
GROUP C	P-25	4	1	4.181
	P-72	5	1	4.761
	P-100	6	1	5.728
	P-89	7	1	7.945
	P-51	8	3	13.021
	P-4	9	2	13.753
	P-3	10	3	13.830
	P-43	11	2	13.883
	P-17	12	2	15.050
	P-75	13	3	18.669
	P-59	14	4	19.381
	P-88	15	3	19.440
	P-61	16	3	19.874
	P-63	17	4	22.083
	P-33	18	3	24.764
	P-48	19	4	24.807
	P-104	20	5	25.466
	P-49	21	6	26.062
	P-29	22	4	27.167
	P-14	23	5	31.862
	P-77	24	6	44.946
	P-113	25	10	45.407
	P-47	26	10	69.662
	P-50	27	14	84.398
		28	22	156.985
GROUP D	P-7	15	1	11.003
	P-94	16	1	11.319
	P-42	17	1	18.076
	P-99	18	1	25.011
	P-110	19	1	28.587
	P-24	20	2	30.502
	P-107	21	3	35.300
	P- 5	22	5	43.218
	P-93	23	2	44.405
	P- 8	24	3	67.385
	P-98	25	8	123.316

DIVISION II

	R- 4	7	1	4.455
	R- 2	8	1	4.560
	R- 5	9	2	6.783
	R- 6	10	3	7.648
	R- 3	11	1	15.629
	R-13	12	2	24.513
	R- 9	13	3	30.347
	R- 1	14	9	62.898

No October Report: International Paper Co., Chisholm, Me., International Paper Co., Riley, Maine, P-2, P-8, P-28, P-64 and P-99.

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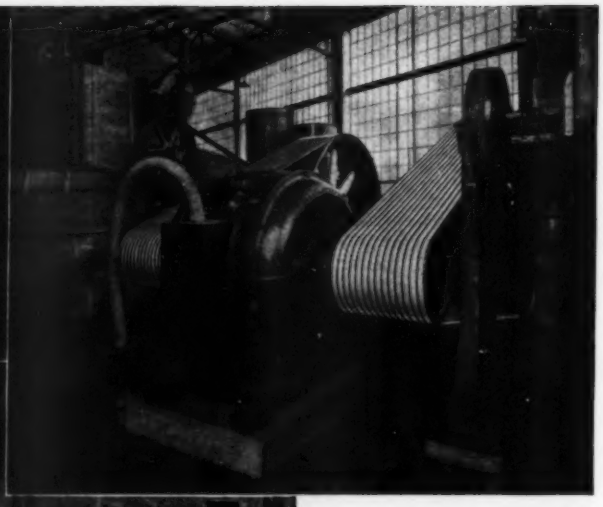

Above: Squirrel Cage Motor driving Beaters in a Western Paper Mill.

Below: Enclosed Fan-Cooled Motors driving Rotary Paper Stock Screens.

Lower: Enclosed Fan-Cooled Synchronous Motors driving Liquor Pumps.

Left: Standard Type Squirrel Cage Motor on a Gear Drive and an Enclosed Fan-Cooled Motor driving a Stock Pump.

PULP, paper and board plants present extra hazards for driving motors especially with the almost constant presence of moisture in all departments.

Allis-Chalmers motors, for a long period of years, have proven unusually successful in this service, in a large number of plants.

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POWER

GENERATION + UTILIZATION + MAINTENANCE

By W. S. JOULE

This section turns the searchlight on power and its allied problems, showing big possibilities to save. Opportunities to improve conditions, methods, apparatus will be discovered. Worth while practices suggest new ideas and wider usages of equipment.

◆ Boiler Feed Lines

Extra heavy material should in common practice be employed on boiler feed pipes, and the size is ordinarily chosen for a velocity of from 300 to 400 feet a minute. To secure a uniform standard, the flanges should be of the same type as that of the main steam piping, and in order to supply any boiler in case of emergency, the main line should be laid out with either a double-header or ring system; sufficient valves being inserted to cut out defective sections readily.

◆ Relining of Boiler Furnaces

In most power plants the boiler settings receive too little attention. The result is that before those in charge realize that anything is wrong, an arch or a lining is ready to fall down, a side wall is bulged out or a baffle has broken down and the boiler must be cut out of service for repairs. In most plants there are regular intervals at which boilers are out of service for cleaning and internal inspection. If, at such times, a thorough inspection of walls, linings, arches, bridge walls and baffles is made and all defects repaired, it will save considerable time, annoyance and expense.

In making an inspection of the walls, it should be noted whether or not they show any signs of bulging out at the sides. Especially is this true if the brick work carries either part or all of the weight of the boiler. Where the boilers are supported by an independent iron or steel structure set into the brick work, care should be taken that in the brick work there are no large holes or cracks leading from the furnace to the supporting structure through which the furnace gases may reach the metal, or the steel is sure to be damaged by overheating or corrosion, or both. In one plant, a 500-hp. boiler, the supporting structure was so badly damaged by overheating that the boiler had to be dismantled, the framework straightened up and the boiler reset.

A thorough inspection of the lining should be made. If any part shows signs of weakness it should be repaired before the boiler is again put into service. Remove all loose bricks and thoroughly clean openings thus formed. Patch with good sound brick, using fire clay mortar and forcing the bricks in tight.

If the boiler is served by a stoker and the setting is provided with inspection doors, the doors should be lined with fire brick or tile to prevent them from being warped out of shape, as it is next to impossible to close a warped door so that air will not enter around it. All inspection doors except, of course, those in the furnace, should have the openings filled with fire brick laid in loosely so that they may be easily removed. They will protect the doors from the intense heat and help to keep air from entering around the door.

After the wall linings and doors have been thoroughly inspected and repaired, the doors should be closed tight and the damper opened wide. Then by going over the setting with a lighted candle or torch any air leaks may be located. It is a good idea to give the setting a carefully applied coating of good plastic cement at least once a year. This, especially in the case of good substantial brickwork, will insure a setting as near airtight as it is possible to have.

The bridge wall also should be inspected, for clinkers will adhere to it and bricks will be loosened in prying the clinkers off. These bricks should be replaced.

Baffles should be carefully inspected to locate any holes and cracks that will permit the gases to short-circuit the heating surfaces. Baffles seem to be subject to the habit of forming these holes and cracks, and unless they are inspected and repaired at regular intervals may be the cause of a great deal of fuel waste.

Arches should also receive attention. When a sprung arch gets into bad shape there is nothing left to do but to tear it out and rebuild, as it is next to impossible to make any repairs that will be anything like permanent. It is different with the suspended arch. If a tile or brick becomes damaged, it may be removed and another slid into its place. When the brick or tile of a suspended arch becomes damaged to any extent it should be replaced at once, otherwise the intense furnace heat will soon damage the supporting iron work. If the tile is kept in good repair it will last indefinitely; but if not, it may fail at almost any time, due to failure of the iron work.

◆ Use of Gaskets

Gaskets must have sufficient strength to withstand the pressure under which they work, and this limits the use of soft gaskets to moderate and low pressures, although soft gaskets reinforced with wire cloth may be used where pressures are comparatively high. Where the face of the flange is of the tongue and grooved type, soft gaskets may be used to advantage on high pressures, as they cannot be blown out of the joint. Several forms of copper gaskets filled with asbestos or other fibrous material to give them the elasticity necessary for filling up the small irregularities of the flange face are on the market and give good satisfaction in all kinds of high pressure piping. All copper corrugated gaskets, also those having corrugations filled with asbestos, are patented articles, and procurable in standard sizes on the market. Even a plain soft copper wire in the shape of a ring also makes a serviceable metallic gasket. One of the principal advantages of metallic gaskets is the fact that they can be used over and over again.

Solid aluminum gaskets have come into quite extensive use and for extreme high pressures and temperatures around 700 degrees Fahrenheit, they are reported to be well suited.

◆ IN A reciprocating pump the slippage may run from 5 to as high as 20 per cent, but should not be over 10 per cent for a pump in fair condition, and with care may be kept down to 5 per cent.

◆ Gauge Checks Scale Accumulation

Suggestion worth trying when scale is troublesome is the placing of a pressure gauge in the feed line some distance from the boiler, this gauge to be used in connection with the boiler gauge to determine the increasing resistance to flow due to the accumulation of scale in the feed pipe.

◆ THE BLEEDER turbine is fundamentally an automatic reducing valve, utilizing the pressure drop at the expense of a small percentage of B. t. u. generating equipment performing useful work. When carrying full load while exhausting all the feed steam through the feeder line, this type of turbine automatically furnished the needed amount of low-pressure steam demanded by the low-pressure load, automatically utilizing the balance.

◆ Inspection of Superheaters Important

Inspection of the superheater should be fully as frequent and rigid as that given the boiler, and repairs should be made immediately if any weakness or imperfection is discovered. Since there is no part of the steam-forming equipment that requires closer attention, it is important that the superheater be easily accessible for inspection, cleaning, and repairs.

NOW MAXIMUM SAFETY in paper cutting

G-E Thrustors Used in New Allsafe Control

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General Electric Company
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Attention: Mr. W. J. Woods
Industrial Department

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We thought you might be interested in the enclosed photograph showing one of our many installations of the Allsafe Control with GE Thrustor on a paper cutter.

Actually, the GE Thrustor has enabled us to finally provide maximum safety for the guillotine-type paper cutter, one of the most hazardous machines in the paper, printing, and manufacturing industries.

The New York State Approval (No. 3010) gives official recognition of the protective qualities of the Allsafe Control with GE Thrustor.

In addition to the safety features of this Allsafe Control with GE Thrustor, our users are finding that the efficiency of their operators is increased due to the reduction of fatigue through elimination of the manual labor of constantly throwing in the heavy clutch.

The GE Thrustor has made it possible for us to meet this important safety need in industry, and therefore, it has opened up a large new market for us.

Yours very truly

AMERICAN ALLSAFE COMPANY

Willard P. Sterne

WILLARD P. STERNE
Director of Sales

This letter shows how another difficult problem was solved easily and effectively by the G-E Thrustor. Wherever there is an operation in your plant that requires a smooth, straight-line thrust with a quick, cushioned return, you will find that this electric device can simplify the job and cut costs. Hundreds of G-E Thrustors are now in service, operating clutches, valves, conveyors, brakes, doors, gates, etc.—work that demands dependable performance and smooth action. G-E Thrustors can be operated by either remote or automatic control. For complete information, write General Electric, Dept. 6B-201, Schenectady, New York.

680-34

GENERAL ELECTRIC

TECHNICAL DEVELOPMENTS

IN THE PAPER INDUSTRY

The following abstracts are of the latest developments found in the foreign press and in the patent offices. Photostats and translations of complete articles and patents can be obtained at cost price.

◆ Moisture, Stock Density and Ash in Pulp

Another paper by the Faserstoff-Analysenkommission des Vereins der Zellstoff u Papierchemiker u Ingenieure (fiber analysis committee of the German Society of Pulp and Paper Chemists and

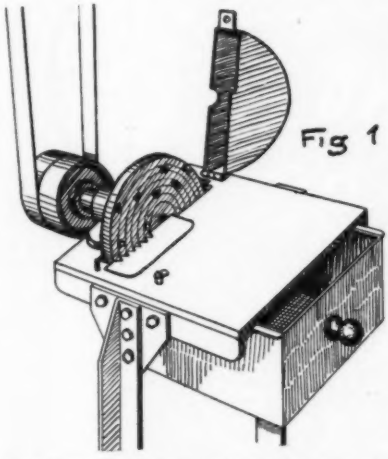
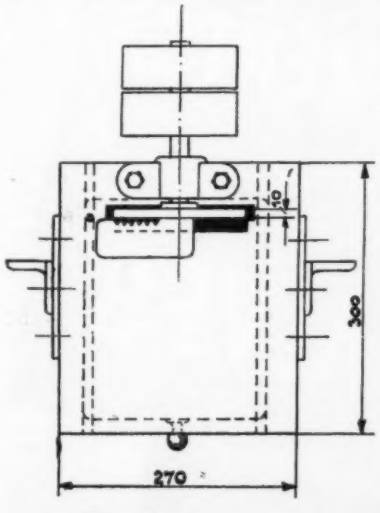


Fig 1

Engineers). Sketch 1 shows the type of circular rasp used in obtaining pulp flakes (in contradistinction to powder) in sizes convenient for determining moisture, ash, alpha cellulose, copper number, wood gum, furfural, rosin, viscosity,



- Fig 2 -

etc. The tool is known as the flake rasp or Flockenraspel. Its plan, with dimensions given in millimeters is shown in Figure 2. The arrangement of the teeth on the disc is indicated in Figure 3, and the individual teeth are shown in Figure 4. The equipment is made by Zellstoffabrik Waldhof, Mannheim. The moisture determination presents no new features in the case of air dry pulp. With wet rolls of pulp, a carefully selected sample of about 300 grams of wet pulp is pulled to pieces by hand, and allowed to stand in a stoppered powder flask for 3 hours to obtain equalization of moisture. The flask is thoroughly shaken, after which a 100 gram sample is dried overnight and weighed. In all cases the actual drying time should be given and the material should be dried to constant weight within 3 milligrams. If the pulp is in the form of slush, the per cent bone dry weight (provided the pulp is unbeaten) or the stock density is determined by Noll's method (Papier Fabr. 26,664 [1928]) using a centrifuge con-

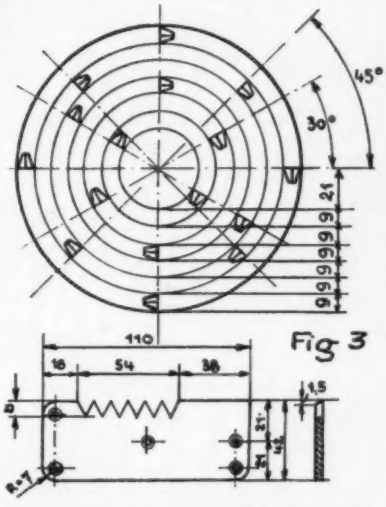


Fig 3

structed by the Pan-Separator-Gesellschaft, Tilsit shown in Figure 5. It was shown experimentally that by using pulp suspensions varying from 1.5 per cent to 20.5 per cent dry pulp, a practically constant moisture content could be reached after centrifuging 3 minutes, irrespective of the original stock density. In the case cited, resulting from 100 experiments, the mean dry pulp content of the centrifuged pulp was 32.2 per cent, but this so-called factor must be determined experimentally for each individual centrifuge. The stock density is then equal to the weight of the centrifuged pulp in (grams) times the above factor, divided by the weight (or volume) of the stock originally measured into the centrifuge. The weight or volume of the sample of stuff to be centrifuged is naturally contingent on the density of the stock. The standardized ash determination, including the ash as the combined sulphates, requires no comment. Thirty-two references to the

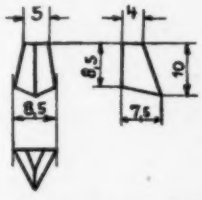


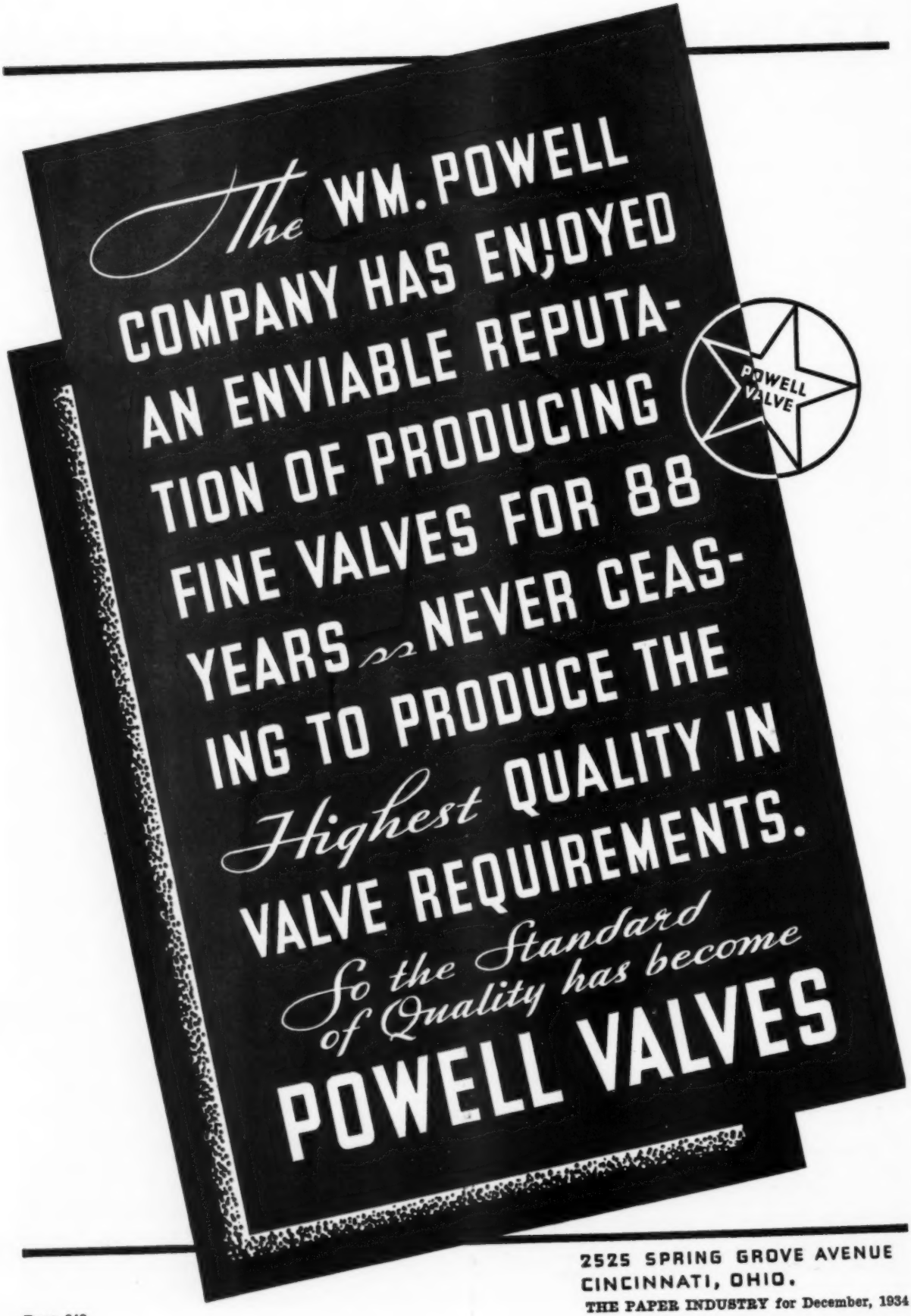
Fig 4

-Fig 5-

literature on which the above methods and determinations are based are cited. Anonymous. Papier-Fabr. 32, No. 27, 313-316 (1934).

◆ Numerical Measure of Degree of Sizing

This method for determining the impermeability of paper, depends on the interaction of 2 drops of solution which are applied on opposite sides of a sheet, 80-100 square cm. in area, securely stretched on a wooden frame. The technique was suggested by L. Kohlmann of Vienna. The reagents to which preference is given are: (1) 0.5 grams phenolphthalein in 10 cc. alcohol, diluted with 400 cc. water to form a milky suspension, and (2) a 1 per cent solution of caustic soda in water. The time required for a pink color to appear on the side of the sheet to which the phenolphthalein was applied, is measured by a stop watch. This time interval is termed the Absolute Degree of Sizing (or S.a.). This figure, divided by the weight of a square meter of the paper is termed the Relative Degree of Sizing (S.r.). In blotting paper S.a. is 0. In ordinary newsprint it is about 8. In fine writing paper, it is 20 or above. The S.r. makes all numerical data more comparable, since they are independent of the thick-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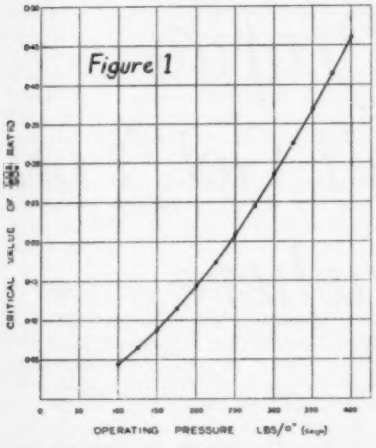
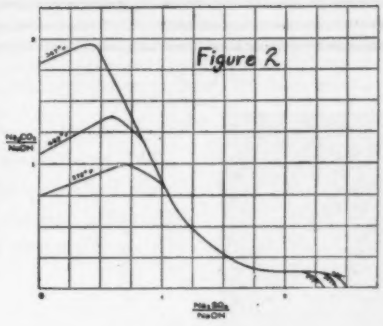
ness. So as to obviate the differences in time lag between the application of the phenolphthalein and that of the soda, the method may be modified by waiting a definite time interval (15, 20, or 30 seconds) before the second drop of solution is applied to the reverse side of the sheet. Other sets of dilute solutions, like potassium ferrocyanide and ferric chloride, which gives Prussian blue, or potassium thiocyanate and ferric chloride, which gives a blood-red color, may also be used. Papyro; Papeterie, 55, No. 23, 1233-7 (Dec., 1933).

◆ Boiler Water Treatment

A survey on modern practice read before the Meeting of the London Division of the T.S. of the Paper Makers' Association. In scale formation, any of the following impurities may be met and dealt with: calcium carbonate, sulphate, chloride or nitrate; magnesium carbonate, sulphate, chloride or nitrate; sodium salts (the sulphate and carbonate of which may actually be of help, whereas the chloride is objectionable in high concentration); iron salts, alumina (which may be helpful or objectionable depending on conditions); silicia (which may be unobjectionable or which may form a very hard scale);

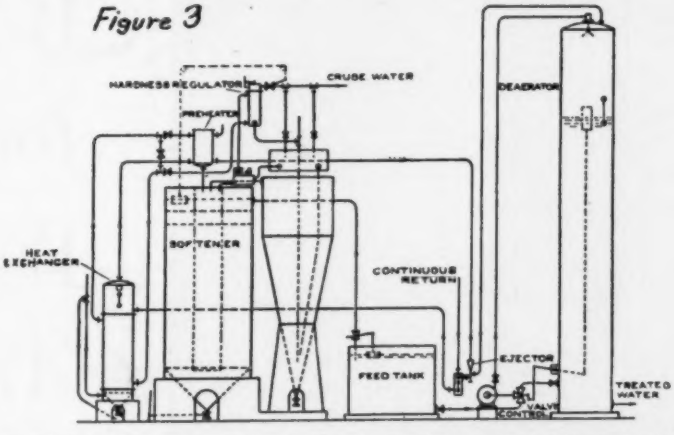


oil (which is undesirable in high pressure boilers). The earlier high estimates of loss in boiler efficiency due to scale must now be modified, not due to the inaccuracy of former experimentation, but rather to the recent marked changes in boiler design. In the older boilers, heat transfer depended largely on conduction and on convection, where the insulating effect of scale played an important role. The modern boiler depends to a great extent on radiant heat for heat transfer. However, while heat losses due to scale have been decreased, scale is still a highly objectionable feature which may prove dangerous due to the temperature rise in the metal in boiler tubes, that may go far beyond 900 deg. Fahr., which is considered the limit of safety. This may cause bulging or even failure. Thin, porous scales often have a more serious effect than those which are hard and dense. The author shows this by means of calculations involving temperature drop across the



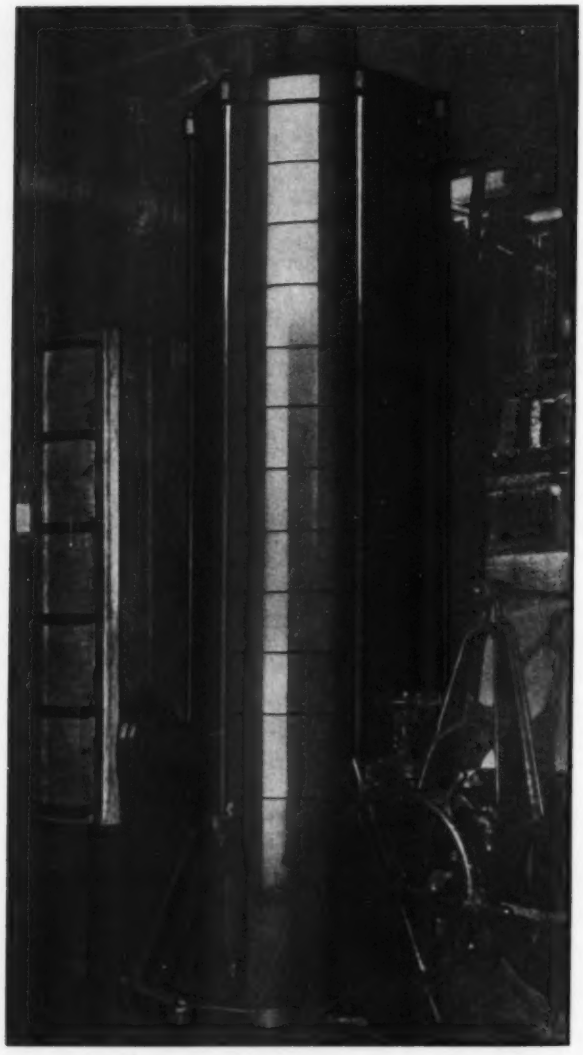
scale, heat transfer, thickness of scale and the conductivity (in B.T.U.'s) of the latter. The theories of scale formation are outlined, especially those depending on the work of the U. S. Bureau of Mines and of individual investigators during the past 14 years. Among the important researches cited are those of Partridge and White (Cf. Ind. Eng. Chem., 21,819 [1929]), who worked with glass boilers and photographed scale being formed on heating plates in calcium sulphate solutions. The basis of boiler water control depends on the ions in the water solution. If the ratio of these ions in feed water is such that only compounds with a positive solubility coefficient (i. e., which become more soluble in water with increasing temperature) are likely to be formed, then scale can be prevented. The most common scale formers are calcium carbonate and magnesium hydroxide (with positive coefficients) and calcium hydroxide, calcium silicate and magnesium silicate (with negative coefficients). The solubilities of calcium sulphate and carbonate are known, so the minimum ratios of CO_3 to SO_4 ion that can be maintained with safety in boilers may be computed and are shown graphically in Figure 1. The use of sodium phosphates and the PO_4 : SO_4 ratios necessary to prevent scale are fully discussed. The relationship between magnesia, alumina, and silica which give flocculent precipitates with the prevention of hard silica scales are also pointed out. Cracks in boiler plate are of three types: corrosion, fatigue, and embrittlement. The latter are fully discussed. Calculations of the relationship between Na_2SO_4 : NaOH, and Na_2CO_3 : NaOH required to prevent such embrittlement are given and the ratios (based on calculation made by Straub) are shown in Figure 2. The base exchange type of water softener, as well as the points that must be watched in its use; the lime-soda type of softener, its disadvantages; and the acceleration in precipitation of magnesium carbonates by means of sodium aluminate are given in a clear exposition. Deoiling is of great importance in most paper mills. It may be effected by: (1) adding the hot condensate to the make-up water soon after the addition of softening reagents and filtering the oil thus entrapped with the precipitate; (2) coagulating the oil by means of alumina and filtering through wood wool or some similar medium. If deäeration of water (to prevent corrosion) is not used, various organic compounds that are readily oxidized or sodium sulphite may be employed. The ideal oxygen content of feed water is 0.1 cc. per liter or less. The concentration of solids and sludge removal are then considered, and continuous blow-down systems (typified by Figure 3) are outlined in some detail. The addition of chemicals at various points of the system, and the difficulties that must be guarded against are then discussed. Finally the testing methods for feed-water or blow-down water samples for hardness, causticity and carbonate alkalinity, sulphates, phosphates, silica, alumina, and oxygen are described. While it contains relatively little new material, the article is well organized, and gives a bibliography of recent literature. H. T. Fisher. Technical Supplement; Paper Maker and British Paper Trade J. 88, No. 3, 166-175 (1934).

Figure 3



◆ Determination of Bound Rosin in Pulps

In a previous issue of THE PAPER INDUSTRY (Cf Vol. 16, No. 8, 589, Nov., 1934) under this same title, a new method by Dr. Ernst Graap was described. This technique has elicited the following criticisms at the hands of the German Fiber Analysis Commission: (1) there may be losses in rosins as determined, due to the elevated tempera-



This machine is refining and hydrating 60 tons of bleached sulphite daily in a Wisconsin Mill.

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PROFITS are not realized by sitting down and wishing for them. There must be some real action to secure profits these days. ❋ Possibly if you would throw out a lot of your present old and obsolete refining equipment and in its stead install a FRITZ REFINING AND HYDRATING MACHINE, thereby lowering your power and other costs, and at the same time improve the quality of your product, your wishes would come true. ❋ This has been done in other mills. Maybe it can be done in yours. ❋ Let us talk it over.

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ture at which oxalic acid is sublimed; (2) calcium oxalate is slightly soluble in either; (3) it overlooks the alcoholic extraction which serves to remove resinates (like calcium and magnesium resinates) completely, and which when coupled with the ether or dichloromethane extraction gives an accurate index of free and bound rosin. V. Hottenroth; Papier-fabr. 32, No. 33 (Technical Section) 367-8 (1934).

◆ Continuous Bleaching of Fibers

The process avoids mechanical action during the bleach. The fibrous material, after it is thoroughly impregnated with the bleaching liquor, is taken up in the form of a suspension on a conveyor which moves at a uniform rate of speed. After traveling a certain distance (and without the addition of further bleach) the pulp is again removed for subsequent treatment. Emil Ekeberg; Konga (Sweden); Austrian Patent No. 134,990, K1.55c.

◆ Mechanical Pulp

The wood containing 50-70 per cent moisture (i. e. the green material) is chipped and then shredded in a so-called dry refiner. This, it is claimed, permits the operator to secure uniformity in the size of the fiber bundles. After adding water to obtain the proper stock density, the pulp is placed in a wet refiner. The final refining stage depends on frictional heat using increased temperatures. If, by chance, the wood has been air-dried, its moisture content should be restored to approximate that of the green wood prior to the original dry refining process. Naamloze Vennootschap Handelsmaatschappij Fibra, Bloemendaal, Holland. German Patent No. 601,-556.

◆ Slitter and Rewinder

As shown in Figure 1, carriage (B) travels supported by uprights (A) and counterbalanced by the weight (C). (B) carries the guide roll (b^1), a supporting roll (b^2), the longitudinal cutter (D), and the sheet separator (E). The rewound sheet (F) rests on the supporting rolls (a^1) and (a^2). The slitter discs (d^2) are fixed on the shafts (d^3) of a successive series of motors (d^1). This is indicated clearly in Figures 2 and 4. These motors (d^1) are fastened to the transverse beam (b^3) of the carriage (B) and move transversally as the sheet advances. Their relative positions may be varied by means of a slide bar (b^4) and a rack-bar (b^5) through crank (e^1) and gears (e^2) shown in Figure 3. The width of the cut sheet may be easily regulated by the operator by changing the distances between the cutting discs, and this sheet width may be read directly on a graduated scale (b^5) as shown in Figure 4. Various methods for the precise regulation of slitters are claimed. For the divers longitudinal cutters (D) motors with varying speeds may be employed, so that the slitting may be carried out under optimum conditions; i. e., in which the best ratio is maintained between the speed of the paper and the peripheral speed of the knives. The advantages claimed (besides those already mentioned) are: freedom from vi-

Fig. 1

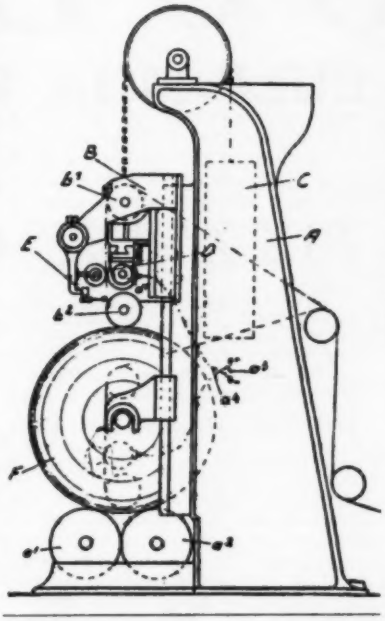


Fig. 2

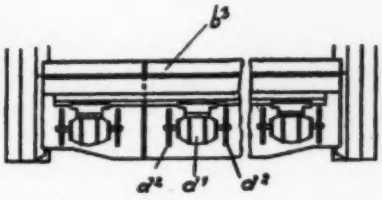


Fig. 3

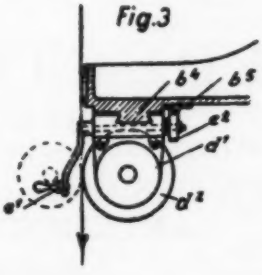
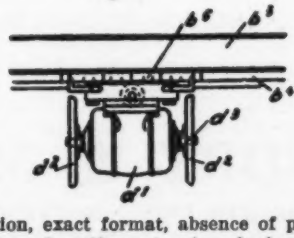


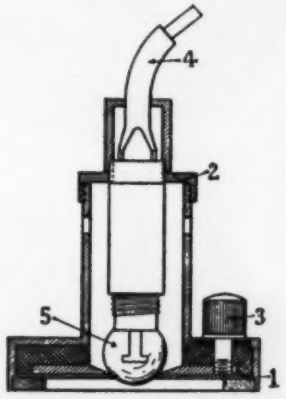
Fig. 4



bration, exact format, absence of paper dust, and uniform tension during the rewinding operation. J. M. Voith Co.; Heidenheim, Brenz. German Patent No. 597,163; French Patent No. 768,129.

◆ Measurement of Whiteness in Paper

F. and M. Lautenschläger of Munich who have devised a new and relatively cheap photo-electric colorimeter (which however cannot be applied to paper, and is therefore not described here) have also inaugurated another form of instrument in which solid opaque bodies like paper sheets can be measured for whiteness and/or color content. This second instrument is shown in the illustration, as an individual photo-cell (1) housed in a nickel case so that the rays of lamp (5) passing through a central opening are reflected on the surface to be examined. In the figure, (3) is one of the two cell terminals, (4) the connecting cord of the lamp, and (5) a bulb taking 3.8 volts. The nature of the surface on which the apparatus is placed determines the intensity of the light reflected from it, and hence regulates the



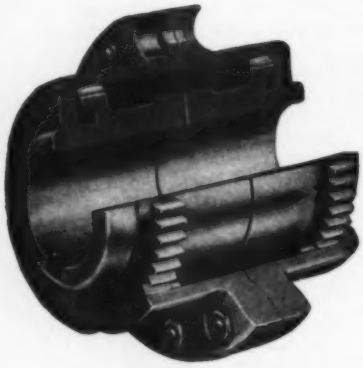
current set up in cell (1). A microammeter connected with (1) permits accurate measurement of the current. By using a standard white surface (or other standard) for comparison, the pointer of the instrument may be fixed at 100 by means of a knob regulating a built-in resistance (not shown in the illustration) and by this device the per cent of variation of the surfaces under observation of the surfaces under observation may be read directly. Color filters can be inserted between cell and the surface to be measured, whenever shade differences have to be dealt with. A modification in technique also serves to measure the transparency. Through one lead, cell and lamp are connected to a pocket battery, and through another to the sensitive ammeter. Silk J. and Rayon World, July, 303 (1934); through Technical Section, Paper Maker and Brit. Paper Trade J., 88, No. 4, 186-7 (1934).

◆ Fireproof Fibrous Materials

Paper or pulp is treated with a soluble acid phosphate, and subsequently with a solution that will cause the precipitation of some insoluble phosphate (like calcium, magnesium, zinc, iron, or chromium) within the cells of the fiber. E. E. M. Payne, Narborough, Leicester; British Patent No. 394,019.

POOLE

PAPER AND PULP MILL EQUIPMENT



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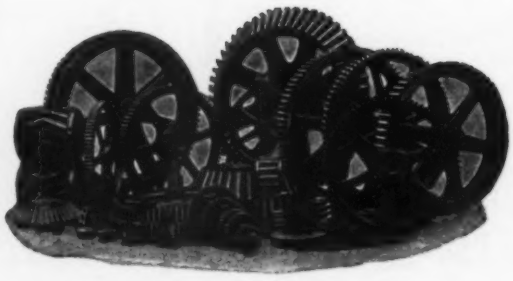

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WOODBERRY, BALTIMORE, MD.

The COMMERCIAL OUTLOOK

New York, December 1, 1934.

AN important development in the paper market situation is the settlement of the newsprint contract basis for 1935. Following considerable agitation on both sides—by print paper manufacturers and also nwspaper publishers—and after much propaganda on the subject from numerous quarters both among producers and consumers of newsprint, the International Paper Company came to the fore with an announcement of an increase of $2.50 a ton, or from $40 to $42.50 after the usual discount, on standard newsprint on contracts for the first six months of the new year, and reserving the right to make a further increase of $2.50 a ton or possibly more dependent on further inflation in the second half of 1935.

Almost immediately following the I. P. Company's notice to its customers and the trade in general, other newsprint manufacturing organizations issued similar announcements raising their contract basis a similar amount, producers in both the United States and Canada taking this action. Thus, a higher price will be put into effect on newsprint for next year, representing the first market advance in the lengthy period of eleven years.

A statement issued by the International Paper Company explained to its customers why it was necessary to increase the newsprint price. The statement stressed the point that new conditions justified the increase and failure to have announced a higher price at this time "would, in our judgment, be equally unwise from the point of view of the publishing industry as well as from that of the manufacturing industry." The statement said, in part:

"In 1930 the net cost of North American newsprint to the publisher was more than 50 per cent above the present level. The present level has, as you know, remained unchanged for over a year and a half in the face of constantly increasing wage levels and materials and supplies. During the same period the prices of all other grades of paper have advanced materially. Newsprint alone has failed to advance.

"Little or no return is being earned on the hundreds of millions of dollars of capital invested in the newsprint industry. In many cases a new dollar is not being earned for an old one and many modern properties have survived only at the expense of their working capital. The industry now faces further increase in cost. We hope that you will realize we are endeavoring to act conservatively under the difficult conditions with which we are confronted."

Generally, the paper market is fairly active. Most reports have told of increases in demand for many classes of paper during the last few weeks, evidently reflecting the usual pre-holidays stimulation of business. There are numerous signs, and backed up by statistics and reports from authoritative quarters, that retail business the country over is picking up at a very gratifying rate, not alone in proportion to that customarily seen in the Christmas shopping season, but beyond this proportion. Since election day general business has forged ahead; there seems more confidence among manufacturers and merchants, and the general consuming public as well, and a truly conservative view is that business is again well on the road to better things.

Paper mills are moderately busy, and in some instances, groups of mills are operating at larger capacity than in a long while. Among these might be mentioned newsprint mills, mills making roofing and building papers, and wrapping paper plants. The outlook is regarded as highly encouraging, the consensus of sentiment within the industry is that next year will witness further progress in pulling out of the depression toward a restoration of more normal business conditions.

Production of newsprint in the United States and Canada in October showed a sharper increase over last year than September did over the corresponding 1933 month. Both countries in October produced 15.3 per cent more print paper than in the similar month a year ago, whereas in September the output rose only 7.12 per cent over last year. Production in the United States in October amounted to 80,572 tons, compared with 82,052 tons in the same month a year ago, a decrease of 1,480 tons or 1.8 per cent. Canadian output amounted to 235,021 tons during October, against 191,452 tons last year, a rise of 43,569 tons or 22.7 per cent. Production in Canada during October was the largest for any October since 1929, when Canadian mills turned out 251,914 tons.

For the first ten months of 1934 Canadian production of newsprint of 2,116,228 tons topped the output in the similar period since 1929, when 2,243,582 tons were manufactured, and compared with 1,640,004 tons in the first ten months of last year, a gain this year of 476,224 tons or 29 per cent. Mills in the United States produced a total of 810,261 tons during the first ten months of this year, against 775,464 tons a year ago, an increase of 34,797 tons or 5.4 per cent. With the exception of 1933, this was the smallest ten months' production for the United States in over a decade. Both countries produced 2,926,489 tons in the first ten months of the current year, a gain of 511,021 tons or 21.1 per cent over 2,415,468 tons in the corresponding period of last year.

Shipments of newsprint from mills in both the U. S. and Canada during October were 5,412 tons under the current production, so that stocks increased moderately during the month. On October 31, however, stocks of 90,590 tons were equal to only 28.7 per cent of the month's output.

Production of paper board in the United States in September last totaled 233,426 tons, compared with 246,266 tons in the preceding month and 252,452 tons in the similar month last year. The September output brought the total for the first nine months of the current year up to 2,082,138 tons, against 2,301,048 tons in the same time of 1933. New orders received by board mills in September called for 228,804 tons, contrasted with 246,187 tons in the month before, while unfilled orders held by manufacturers at the end of September were 72,930 tons, against 71,523 tons a month before. Shipments of board from mills aggregated 198,729 tons during September, compared with 223,686 tons in the preceding month, and stocks on hand at mills at the close of September amounted to 72,436 tons, against 70,064 tons a month previously.

◆ ◆

◆ Duriron Appointments

The Duriron Company, Inc., Dayton, Ohio, has announced the appointment of M. L. Bettcher, formerly general superintendent, to the position of general manager, succeeding Dudley H. Miller, who becomes executive vice president.

The company has also announced several changes in branch office management. N. E. Philpot, who has been manager of the Chicago office, assumes charge of the New York office, succeeding W. E. Pratt, resigned. Col. M. W. Smith, formerly manager at Buffalo, is taking over the Chicago office. W. A. Watkins has been transferred from the general sales department at Dayton to Buffalo as manager.

◆ J-M Credit Corp.

Johns-Manville has announced that its recently formed subsidiary, the Johns-Manville Credit Corporation, through cooperation of the Federal government, is now able to finance industrial and commercial repair and modernization work at the lowest carrying charges ever offered in a deferred payment plan of this kind. The cost of financing is $5 per $100 per annum, the same as specified in the National Housing Act.

The new corporation is capitalized at $1,000,000 to make credit for repairs and improvements easily obtainable. No down payment is required under the arrangement and amounts up to $2,000 may be obtained for each building involved. Payments are made in monthly installments over a period of from one to three years.

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Domestic RAW MATERIALS

◆ Papermaking Rags

As usually is the case as the end of the year and inventory time draws near, paper manufacturers in a large majority of instances are engaging in raw material purchases on a restricted scale, and are keeping out of the papermaking rag market except when needing supplies to satisfy more or less immediate requirements. The result is a quiet rag market prevails, and business developing is very spotty and generally confined to rather small volume. As also is customary at this period of the year, there are dealers eager to accomplish sales of rags, with a view to converting stocks int cash and to reduce their inventories for the year-end check-up, and the probabilities are some are willing to shade prices to secure orders from paper mills.

However, it cannot be said there has been any general downward movement of market prices. On the contrary, many grades of papermaking rags display a distinctly firm undertone, and the supply situation in certain cases is such that a prediction higher market levels will be seen when and if consuming demand increases probably will not prove a bad guess. There seems little or no question paper manufacturers have purchased rags in an ultra-conservative manner for some while, and the logical assumption is most paper mills have decidedly limited stocks on hand. It is the dealer, it would appear, who is carrying the stock of rags at present, and what with reduced production and collections, high costs at production sources, fair-sized exportations from this country to Europe and exceedingly slim imports, the technical position of the market has every indication of strength, though this characteristic scarcely comes to the fore with paper manufacturers buying as guardedly as they now are.

Fine paper mills are confining their takings of rag stock practically exclusively to new cuttings, as has been the case for some time. Moreover, orders are coming in for limited-sized parcels, and principally for a few grades of new cuttings. No. 1 white shirt cuttings are reported available at 6 cents per pound f. o. b. dealers' shipping points, and possibly in some exceptional cases at slightly below this level. Fancy shirt cuttings are 2 cents, washables 1.75 cents, unbleached muslins 6.25 to 6.50 cents, blue overall cuttings 3.50 to 3.75 cents, light silesias 3.75 to 4 cents, khaki cuttings 3.50 to 3.75 cents, and bleached canton flannels 5.50 cents. Old No. 1 repacked white cottons are available at 2.50 to 3 cents, depending on grade of packing, but are little desired by paper mills. Old blue cottons are almost completely neglected, with repacked thirds and blues reported offered at 1.15 cents a pound, and perhaps at less, f. o. b. shipping points.

The roofing rag situation is very firm, statistically speaking, and prices currently are steadily maintained while showing a rising tendency. Mills have absorbed supplies freely of late and the market appears well sold up; also, very little supply is coming in from abroad for the reason prices in Europe are far above a parity with ruling market levels here. Domestic No. 1 roofing is selling in the East at 1.10 cents per pound f. o. b. shipping points, and No. 2 stock at 80 cents a hundred pounds. It is said foreign dark cottons are scarcely to be had from northern European sources under 1.25 cents a pound landed at New York, and quotations on foreign linsey garments range from 1.60 cents all the way up to 2 cents on a landed basis.

◆ Old Paper

The emergency in the waste paper industry and fixed minimum sales prices for folded newspapers and mixed papers have been extended by the NRA, as of November 19, for an indefinite period following the first three months trial period. Therefore, minimum prices of 42½ cents per hundred pounds on folded news and 32½ cents on mixed paper continue to prevail, f. o. b. packers' plants in sales to consuming mills. The established price set-up seems favored by the trade in most sections of the country although there is objection from some parts of the East, notably New York. Other grades of old paper are in moderate demand and ruling steady in price. A bright spot in the market is the call from mills for No. 1 hard white envelope cuttings which are bringing 2.75 cents and more per pound in the East f. o. b. shipping points. No. 1 hard white shavings are around 2.25 cents a pound at dealers' points, No. 1 soft white shavings 1.90 cents, white blank news cuttings 1.25 cents, No. 1 old kraft paper 95 cents to $1 a hundred pounds, heavy book stock 55 to 60 cents a hundred, and old corrugated 37½ to 40 cents per hundred.

◆ Pulpwood

Pulpwood quotations are maintained with little or no change noted. Canadian wood is reported selling in the Upper New York State district at $12.50 a cord for four-foot peeled, $13.50 for hand-shaved, and $15 for two-foot rossed.

◆ Mechanical Pulp

The market for groundwood has quieted. There is a steady routine movement against contracts, and occasionally of course consumers come into sight to add to their supplies in a limited way. However, little concerted demand is reported, and prices in some cases have eased a bit. Domestic groundwood is $27 or $28 a ton f. o. b. pulp mills in New York State, or, depending on the freight haul, from $30 upwards on a delivered consuming mill basis. Canadian producers are mostly asking at least $20 per ton f. o. b. pulp mills for prime groundwood for shipment to the States, or $25 ex dock New York or other U. S. Atlantic ports. Foreign dry groundwood of Scandinavian origin is quoted at $22 to $23 per short ton ex dock American Atlantic seaboard.

◆ Chemical Pulp

As far as the open market is concerned, not much buying of chemical pulp is reported. Most consumers apparently have their needs covered for a time and are not inclined to add to their supplies or commitments. However, the movement on contracts keeps up steadily, and indications point to most domestic pulp mills being fairly busy and provided with an outlet for the bulk of their production. The price tone is none too firm, but no definite changes of consequence are reported. Bleached sulphite manufacturers are adhering to the established basis of 2.75 cents upward per pound for prime bleached ex dock Atlantic seaboard, while prime unbleached sulphite is 2.10 to 2.20 cents a pound for ordinary grades and 2.25 to 2.30 cents for extra strong sulphite. Domestic bleached soda pulp is 2.50 cents delivered paper mills, and domestic kraft on a rather broad quotable range of 1.65 to 2 cents a pound f. o. b. producing points.

◆ Rope and Bagging

Operating in a quiet manner, paper manufacturers have recently purchased old manila rope in fair volume, though at little or no advancement in price. No. 1 domestic old manila is reported available at 2 cents per pound f. o. b. shipping points, and foreign rope at slightly under this level or about 1.90 cents ex dock basis at American Atlantic ports. Dealers assert there is not much old rope reaching the market, that most of the rope lately bought by mills was an accumulation of several months, and that the supply condition is bullish. Bagging is in spotty demand at around 1.15 cents a pound at shipping points for No. 1 domestic scrap burlap, and 65 cents a hundred pounds for roofing bagging. Gunny bagging is firm on a quotable basis of 1.30 cents per pound f. o. b. shipping points for domestic, and 1.60 cents ex dock New York for imported gunny.

◆ Chemicals

Papermaking chemicals are generally steady quotably, with manufacturers now arranging schedules for 1935. Caustic soda is 2.60 cents per pound at works for the 76 per cent solid product, and 3 cents for flakes, while soda ash is 1.25 cents for the 58 per cent light in bags f. o. b. works. Casein is quoted at 9.50 to 10.50 cents for domestic, and 14 to 14.50 cents for Argentine, according to the grind. Lump alum is 3.25 to 3.50 cents and powdered around 3.75 cents.

On Choosing The Right Felts

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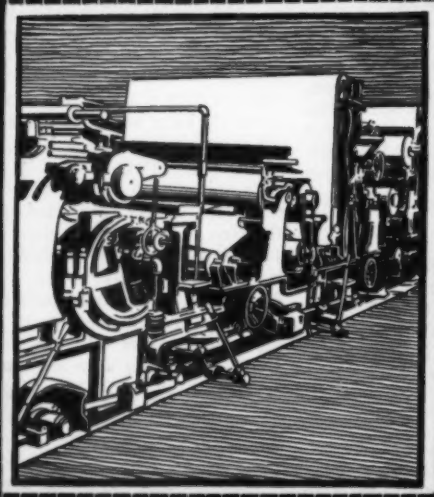

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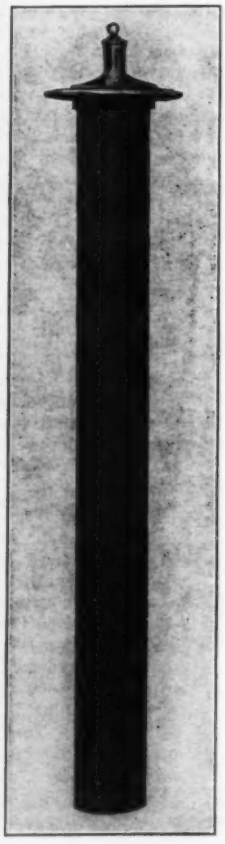

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Import and Export MARKETS

IMPORTS

◆ Wood Pulp

There are several factors, it would seem, prompting paper manufacturers to hold off purchasing wood pulp, other than of course when having definite requirements to cover or finding themselves needing additional supplies to augment stocks or incoming shipments. There is apprehension concerning exchange fluctuations over the next few months, with the result papermakers are not very eager in most cases to buy pulp for forward shipment from abroad in accustomed tonnage. There is, also, the price element. Apparently, the opinion is common among paper manufacturers there will be no material change in the market level in an upward direction in the near future, or over the forthcoming few months. Many consumers feel price changes will be in the opposite course, that if quotational revisions are made they will be downward. Consequently, the policy now being generally followed by paper manufacturers is to hold off contracting for foreign pulp on any large scale, presumably on the theory that when they need pulp there will be no difficulty in getting it, and perhaps at reduced costs.

Uncertainty in the paper market outlook also is delaying customary pulp purchases to some extent. Not that paper manufacturers are dubious regarding the future of their market, but it is to be readily observed that many are not inclined to make pulp commitments so far ahead or in as large tonnage as they usually do at this time of the year pending a clearer idea of what their requirements are likely to amount to. Furthermore, many paper mills are comparatively well supplied with pulp, reflecting in good part fairly heavy buying early this year, and are receiving tonnage against back contracts which covers the bulk of their present needs. Therefore, the market as a whole is rather quiet, with the activity developing principally of routine character and with sellers apparently more desirous of orders than are consumers to buy.

However, the price situation shows little change, quotations on most imported pulps holding to stationary levels and producers in Europe, Canada or elsewhere evincing scant willingness to grant concessions from asked figures. Sulphite is maintained on established price bases of 2.75 cents upwards per pound ex dock American Atlantic seaboard for prime bleached, 2.10 to 2.20 cents for ordinary prime grades of unbleached, and 2.25 and 2.30 cents for easy bleaching and Mitscherlich sulphites. Prime Scandinavian kraft is reported available at 1.65 to 1.75 cents a pound, seaboard basis, and European dry groundwood is bringing $22 to $23 per short ton ex dock U. S. Atlantic ports. There is some reselling of pulp by paper mills having a surplus, and in such cases buyers sometimes are securing limited-sized lots at slightly under the market's quoted levels.

Pulp imports into the United States during September recorded a slight decrease compared with the preceding month, according to official U. S. Department of Commerce statistics. The September importations amounted to 124,591 long tons of chemical, valued at $4,971,827, contrasted with 127,557 tons of a declared value of $5,131,607 in August this year, and 171,750 tons of a value of $6,035,752 in September last year. Imports during the first nine months of the current year aggregated 1,040,616 long tons of chemical pulps, or almost identical with the total of 1,039,055 tons in the corresponding time a year ago. Groundwood imports in September were 17,249 long tons of a value of $296,911, making a total for the first nine months of the year of 121,283 tons, compared with 122,731 tons in the same period of 1933.

◆ Paper Stock

Imports of papermaking rags into the United States this year are running somewhat smaller, in point of tonnage, than last year, but the value of this year's receipts is above that of a year ago. September imports amounted to 7,715,972 pounds, valued at $123,763, according to Department of Commerce figures, comparing with 6,627,499 pounds of a value of $53,699 in the preceding month, and making a total for the first nine months of 1934 of 80,690,769 pounds of a value of $1,020,289, against 134,333,646 pounds of a declared value of $839,374 in the same period last year. Imports of miscellaneous paper stock, comprising old rope, bagging, waste paper, etc., in September last were 3,522,675 pounds of a value of $32,181, bringing the total for the first nine months of the current year up to 41,104,767 pounds.

◆ Paper

Paper imports into the United States in September showed a slight decline in total value as compared with the month before, and also were under the arrivals in the same 1933 month. According to U. S. Department of Commerce statistics, imports of all kinds of paper in September reached a total value of $6,505,898, against $6,750,847 in the preceding month and $7,738,772 in September last year. The bulk of imports in September was, of course, newsprint, receipts of which were valued at $5,544,292, as contrasted with $5,954,533 in August this year and $6,795,394 in September a year ago. The next most important class of paper imported was cigarette paper, imports of which were valued at $441,444 in September, against $371,683 in the same month last year. Imports of all paper during the first nine months of the current year aggregated in value $62,757,196, of which $54,953,430 worth was standard newsprint, compared with a total of $55,660,559 in the corresponding time of 1933 and including newsprint valued at $49,534,668.

EXPORTS

Exports of paper from the United States are registering a fair gain, in total value, over a year ago, and, according to U. S. Department of Commerce figures, reached $13,990,039 during the first nine months of this year, compared with $10,200,612 in the similar period of 1933. The September exports were valued at $1,746,759, against $1,242,956 in the same month last year.

Newsprint exported from this country in September amounted to 3,952,017 pounds, valued at $84,799, compared with 1,763,979 pounds of a value of $39,470 in the similar month a year ago. Uncoated book paper exports were valued at $78,269 in September, contrasted with $101,465 last year in the same month, while wrapping paper shipments reached a value of $209,754, against $83,460 last year, and writing paper exports were valued at $97,405, against $79,120. Exports of tissue and crepe paper were valued at $67,856 during September, against $41,024 last year; of blotting paper, $10,205, against $15,124; of greaseproof and waterproof paper, $50,669, against $86,759; of toilet paper, $73,798, against $52,132, and of cover paper, $10,542, against $8,704.

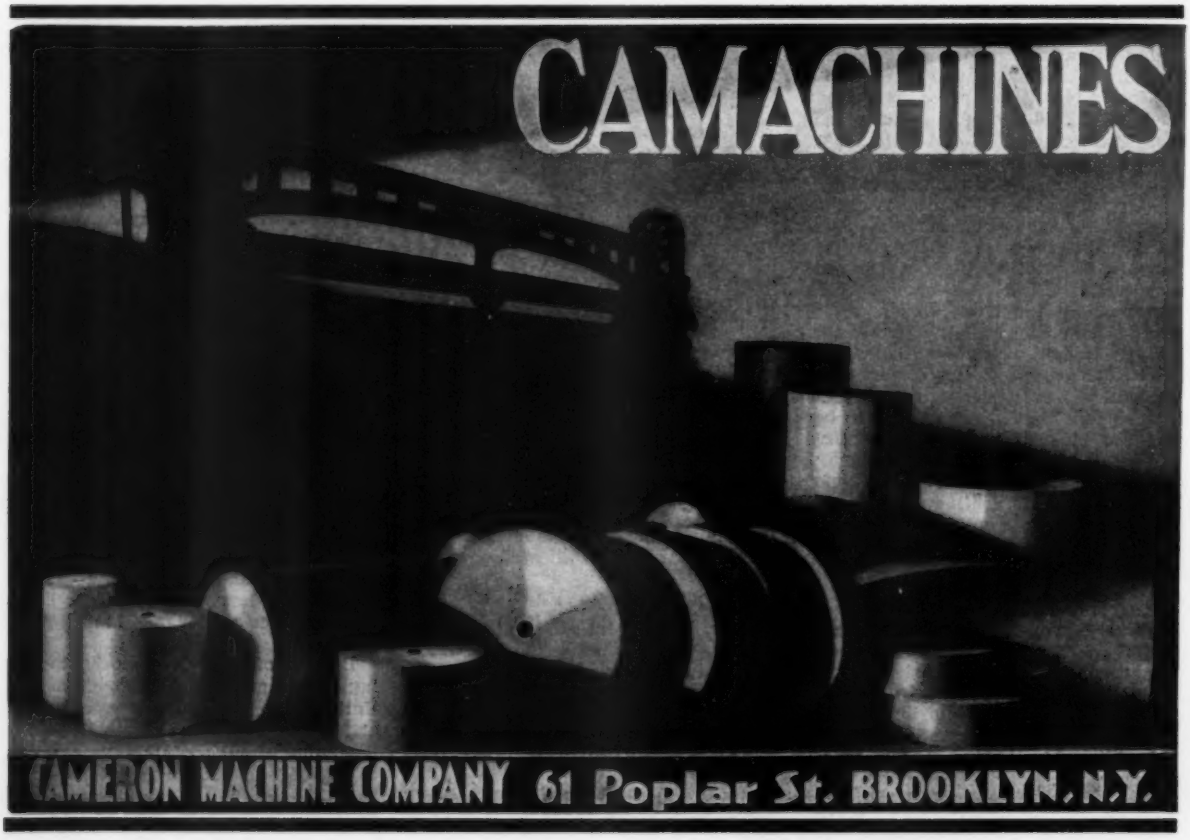
Boxboard exports from the United States were valued at $96,530 in September, contrasted with $64,494 last year, and of other paperboard, $55,784, against $32,643. Paper bags were exported to a value of $95,417, compared with $48,076 last year, and paper boxes and cartons to a value of $73,913, against $30,679.

Exports of paper base stocks, including wood pulp, rags, etc., from the United States in September were valued at $1,070,167, bringing the total for the first nine months of this year up to $5,867,636 and showing a considerable increase over the exportations valued at $2,511,404 in the same time of 1933.

Season's Greetings

At this season of the year our thoughts revert to those whose co-operation, loyalty and friendship in the past have so materially assisted us.

To You All, the Makers of TENAX FELTS extend these greetings:

A Merry Christmas and a Happy and Prosperous New Year

LOCKPORT FELT COMPANY
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